

BIRDS OF VOLCÁN DE CHIRIQUÍ,
PANAMA

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INTRODUCTION

The earliest references to Chiriquí birds are those of Gould, who, in 1850, described a new umbrellabird and six new hummingbirds collected the previous year at David and on the Pacific slope of Volcán de Chiriquí by M. Warcewicz, a Polish botanist. During the latter half of the century collections made by Enrique Arcé and others in "Veragua" (present-day Veraguas and Chiriquí) revealed the opulence of bird life in western Panama and were the basis of important reports that stimulated a continuing interest in the region.

Arcé and his contemporaries, working chiefly in the lowlands, succeeded in collecting almost 450 forms in the two departments by the year 1870. The relatively meagre representation of highland birds taken by Arcé on the Pacific slope (below 6,500 feet) of Veraguas and Chiriquí served to establish the character and affinities of the mountain fauna, but no collections were made at high altitudes before the present century.

The first and until recent years the only large collection of birds from the upper slopes of Volcán de Chiriquí was made by W. W. Brown, Jr., in 1901. During a period of about eight months (January-August) Brown collected more than 1,400 birds, chiefly in the vicinity of Boquete and on the volcano to an altitude of 11,200 feet. Bangs' fine report (1902) on this collection includes the descriptions of fourteen new birds and lists a total of 260 forms, of which 215 were collected in the highlands. Several short papers relating to the bird life of Volcán de Chiriquí have since been published, but Bangs' report has until now been our principal source of information about the birds found on Panama's westernmost and greatest mountain.

The present report is based on a series of 1,611 specimens collected over a period of twenty years (1932-52) by Señor Tolef B. Mönniche at altitudes exceeding 5,000 feet on Volcán de Chiriquí and nearby mountains in extreme western Panama. Several hundred additional

Mönniche specimens that were either deposited in the National Museum of Panama or given to visiting ornithologists by the collector have not been available for this study.

Most of the specimens listed below were taken in the vicinity of Lerida, Señor Mönniche's coffee plantation, and at higher elevations on the eastern and northeastern (Pacific) slopes of the volcano. Birds of both Subtropical and Temperate Zones are well represented. A number of the specimens were collected north of the volcano, on the southern or Pacific slope of the Cordilleras, and several score were taken at high altitudes on Holcomb (= Boquete) Trail, in the Province of Bocas del Toro. Of the 235 forms represented, 58 are additions to those collected by Brown at altitudes exceeding 4,500 feet. However, it is noteworthy that Brown's mountain collection included some 23 forms apparently overlooked by Mönniche. Thus the two collections, and several birds reported by others, bring to almost 265 the number of forms at present known from the Volcán de Chiriquí massif.

For its locality the Mönniche collection unquestionably is pre-eminent both in size and in comprehensiveness. However, its real importance lies elsewhere, and in several respects the collection probably is unique. Perhaps never before in tropical America has so large and representative a collection been made, at all seasons over a period of many years, by one man in a single area. Many species, including certain rarities, were obtained in series of sufficient size to permit objective study of several aspects of variation, and, in the case of migrants, to determine with some degree of accuracy the dates of arrival and departure.

The specimens are superior in preparation and for each there are complete data, including a reference to altitude determined by a man trained as a civil engineer and thoroughly familiar with his area. It is to the lasting credit of Señor Mönniche, a largely self-taught layman isolated from encouraging influences, that he both practiced his avocation with purposeful intelligence and at an advanced age (78) made his collection permanently available to the scientific world.

In the course of this study I have had occasion to investigate the relationships of numerous rare or questionable forms and have, in some instances, reached conclusions differing from those currently held. The new comparative material from a critical area has also enabled me to verify certain findings of others, as indicated in the following list.

Odontophorus guttatus matudae = *Odontophorus guttatus*
Claravis mondetoura pulchra } = *Claravis m. mondetoura*
Claravis mondetoura inca }
Piaya cayana incincta = *Piaya cayana thermophila*
Centurus rubricapillus costaricensis = *Centurus r. rubricapillus*
Myiarchus tuberculifer bangsi = *Myiarchus tuberculifer nigricapillus*
Nuttallornis borealis cooperi = *Nuttallornis borealis*
Cyanolyca cucullata guatimalae = *Cyanolyca cucullata mitrata*
Cyanolyca argentigula blandita = *Cyanolyca a. argentigula*
Thryothorus modestus elutus = *Thryothorus m. modestus*
Vireo olivaceus insulanus = *Vireo olivaceus flavoviridis*
Hylophilus decurtatus pusillus = *Hylophilus d. decurtatus*
Oporornis tolmiei austinsmithi } = *Oporornis tolmiei*
Oporornis tolmiei intermedia }
Myioborus miniatus acceptus = *Myioborus miniatus aurantiacus*
Thraupis virens diaconus = *Thraupis virens cana*

The following taxonomic changes seem appropriate in view of pertinent information presented herein.

Ciccaba nigrolineata becomes *C. huhula nigrolineata*
Lampornis castaneoventris becomes *L. c. castaneoventris*
Lampornis cinereicauda becomes *L. castaneoventris cinereicauda*
Scytalopus chiriquensis becomes *S. argentifrons chiriquensis*
Turdus ignobilis plebejus becomes *T. p. plebejus*

The following birds taken at high altitudes on the northern or Caribbean slope of the Cordilleras apparently are the first records from Bocas del Toro.

<i>Eupherusa nigriventris</i>	<i>Serpophaga cinerea grisea</i>
<i>Trogon collaris puella</i>	<i>Phainoptila melanoxantha melanoxantha</i>
<i>Pseudocolaptes lawrencii lawrencii</i>	<i>Myioborus torquatus</i>
<i>Myrmeciza immaculata zeledoni</i>	<i>Basileuterus tristriatus melanotis</i>
<i>Cephalopterus ornatus glabricollis</i>	<i>Tangara dowii</i>
<i>Empidonax atriceps</i>	<i>Chlorospingus ophthalmicus noricius</i>
<i>Mitrephanes phaeocercus aurantiiventris</i>	<i>Lysurus crassirostris</i>

When warranted, emphasis has been placed on a consideration of the breeding periods and altitudinal preferences of resident birds, the dates of arrival and departure of northern migrants, and related matters about which there is very little specific information for any tropical area. I have, therefore, presented most of my data in detail, in the interest of those who may wish to make similar studies elsewhere in Middle America. It has seemed especially desirable to record all of the specimens, their localities and associated dates, inasmuch as the rapidly changing ecological conditions on Volcán de Chiriquí can be expected to affect quite radically the future distribution of its bird life.

COLLECTING LOCALITIES

In correspondence Señor Mönniche has identified his collecting localities as follows:

Alto de Chiquero: Local name of the plateau north of Río Chiquero.

Bajo Mono: Upper valley of Río Caldera.

Callejon de Palmas: A canyon on Casita Alta, north of Fila Lerida, sloping eastward from the foot of Cerro Copete.

Callejon Seco: A canyon sloping eastward, the north rim of which forms the southern boundary of Quiel.

Camiseta: Local name of a ridge south of Copete.

Camp Cylindro (not shown on map): Highest of three collecting sites on Holcomb Trail when descending the northern or Caribbean slope (Bocas del Toro) of the Cordilleras.

Camp Holcomb (not shown on map): The second of three collecting sites on Holcomb Trail when descending the northern or Caribbean slope (Bocas del Toro) of the Cordilleras.

Casita Alta: A section of the Mönniche properties adjacent to other properties called Peña Blanca and Velo. Named for a small hut (altitude 7,000 feet) that has been used as a base by visiting biologists. Maximum altitude about 9,000 feet.

Cedral (not shown on map): Lowest of three collecting sites on Holcomb Trail on the northern or Caribbean slope (Bocas del Toro) of the Cordilleras. Cedral is adjacent to a small stream in a fine, extensive forest.

Cerro Copete (see Copete).

Chiquero: Upper valley of Río Chiquero, which flows into Río Caldera at Bajo Mono.

Conejo: Local name of a valley leading southward at western end of Hortigal.

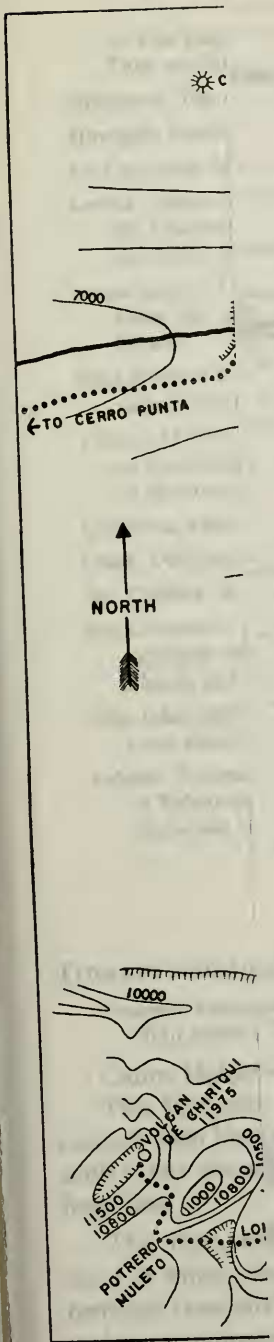
Copete (also called La Campana): One of the foothills of Volcán de Chiriquí. Copete has a maximum altitude of about 10,000 feet. It is east of the summit of Volcán de Chiriquí and west of the Mönniche properties of Casita Alta and Peña Blanca.

Cordilleras: The central chain of mountains extending east and west and forming the Continental Divide. The southern slope is in Boquete district, Province of Chiriquí, the northern slope in the Province of Bocas del Toro. Volcán de Chiriquí is south of the Cordilleras, from which it is separated by Río Caldera and Río Chiriquí. Mönniche specimens from the Cordilleras were taken at or near the point crossed by Holcomb Trail.

El Velo (see Velo).

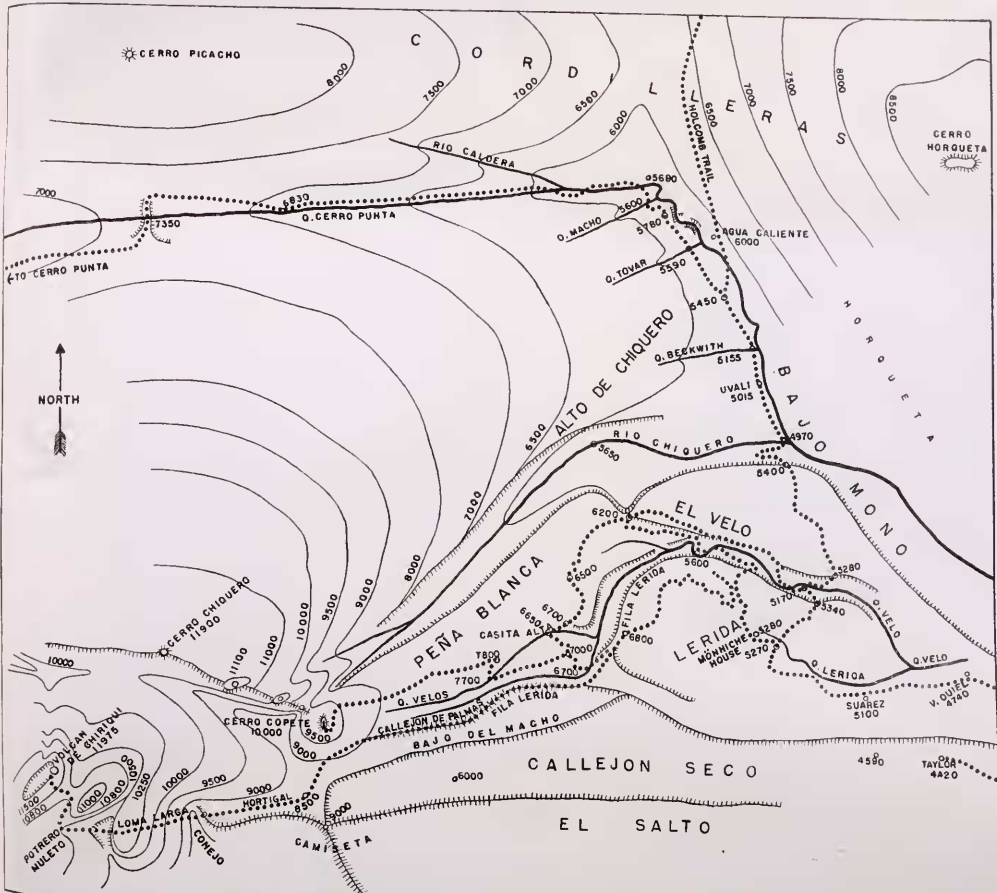
Fila Lerida: A narrow ridge sloping eastward from the foot of Cerro Copete at the southern boundaries of Casita Alta and the southern side of Quebrada Velo.

Holcomb Trail (also known as Boquete Trail): A trail connecting Boquete and Bocas del Toro, constructed in 1910(?) by an American engineer (Holcomb) in the employ of the Panamanian government. The three collecting sites



MAP SHOWIN

REPRODUCED FROM THE NATIONAL GEOGRAPHIC MAGAZINE



MAP SHOWING COLLECTING LOCALITIES IN REGION OF VOLCÁN DE CHIRIQÚÍ, EXTREME WESTERN PANAMA

on this trail (Camp Cylindro, Camp Holcomb, Cedral) are in Bocas del Toro at altitudes exceeding 4,800 feet.

Horqueta: The coffee district located on the southern slope of Cerro Horqueta.

Hortigal: Local name of the valley between Copete and Camiseta.

La Campana (see Copete).

Lerida: Name of the Mönniche plantation and of the surrounding region, in the District of Boquete. The plantation is about 4½ air miles west and northwest of the town of Boquete.

Loma Larga: Local name of a long slope ascending westward from Conejo. From the summit (10,500 feet) the terrain drops by precipices to Potrero Muleto.

Peña Blanca: A section of the Mönniche properties adjacent to other properties called Casita Alta and Velo. Maximum altitude about 9,500 feet.

Potrero Muleto: An extinct crater at an altitude of 10,000 feet, south and west of the summit of Volcán de Chiriquí, the crater of which is north and west of its summit.

Quebrada Velo: A creek flowing between Lerida and Casita Alta.

Quiel: Outlying section of the town of Boquete, District of Boquete.

Río Caldera: A river of the Boquete district.

Río Chiquero: A stream flowing into the Río Caldera at Bajo Mono. The southern rim of the Chiquero Valley is the northern boundary of Peña Blanca and Velo.

Velo (also known as El Velo): A section of the Mönniche properties, which total about 900 acres, in the eastern foothills of Volcán de Chiriquí.

Volcán: Common designation for Volcán de Chiriquí, more correctly known as Volcán de Barú. The summit, or highest point of the rim, is 11,975 feet above sea level (U.S. Navy map).

LIST OF SPECIES

Tinamus major fuscipennis Salvadori. Great Tinamou.

Tinamus fuscipennis Salvadori, 1895, Cat. Bds. Brit. Mus., 27: 500—Escondido River and San Rafael, Nicaragua.

Camp Holcomb: ♂, July 15, 1933. Altitude 5,000 feet.

This bird was accompanied by two juveniles. It agrees in every respect with birds from the coastal lowlands of Bocas del Toro (Cricamola), but the altitude is without precedent for this essentially lowland bird.

The *fuscipennis-robustus-percautus* complex represents a color cline in which the more southern birds are conspicuously darker and browner (less olive) than those from the north. Mexican and Guatemalan specimens are readily distinguished from those of southern

Nicaragua southward, but birds from the intervening region tend to be variable and represent an intermediate population for which the name *robustus* has been consistently used.

The range of *robustus*, as emended by Wetmore (1943, p. 229), extends from east central Guatemala to northern Nicaragua. However, it is noteworthy that the influence of *fuscipennis* is reflected in birds from the Caribbean lowlands as far north as Honduras. Indeed, several specimens in Chicago Museum from Copan and Santa Barbara agree more decidedly with representative *fuscipennis* than with *robustus*. At the other extreme, two British Honduras birds (Belize and Manatee Lagoon) approach but are not wholly typical of the pale northern form, *percautus*.

Nothocercus bonapartei frantzii (Lawrence). Highland Tinamou.

Tinamus frantzii Lawrence, 1868, Ann. Lyc. Nat. Hist. N. Y., 9: 140—Cervántes, Costa Rica.

Alto de Chiquero: ♂, 2 ♀, April 19–May 17. Quebrada Velo: ♂, August 8. Gonads enlarged. Altitude 5,400–6,500 feet.

Griscom, writing in 1935, noted the absence of recent records from Volcán de Chiriquí. The Mönniche specimens, of which three were taken in 1933 and the fourth in 1939, attest to the persistence of this tinamou locally despite continuing ecological changes wrought by man in recent years.

Crypturellus soui modestus (Cabanis). Little Tinamou.

Crypturus modestus Cabanis, 1869, Jour. Orn., 17: 312—Costa Rica.

Horqueta: ♂, May 10, 1933. Gonads enlarged. Altitude 5,300 feet.

Essentially a bird of lowland forests, heretofore unreported in the vicinity of Cerro Horqueta, or at altitudes exceeding 4,800 feet in Panama.

Phalacrocorax olivaceus olivaceus (Humboldt). Olivaceous Cormorant.

Pelecanus olivaceus Humboldt, 1805, Rec. Obs. Zool. Anat. Comp., 1: 47—Banco, Río Magdalena, Colombia.

Lerida: ♂, October 3, 1936. Altitude 5,300 feet.

Davidson (1938, p. 256) observed individuals on several occasions on the Caldera River, near Boquete, at an altitude of 3,800 feet. The Lerida specimen, from an unprecedented altitude, is the first collected in the Province.

Ardea herodias herodias Linnaeus. Great Blue Heron.

Ardea herodias Linnaeus, 1758, Syst. Nat., 10th ed., 1: 143—Hudson Bay.

Lerida: ♂, November 19, 1946. Altitude 5,300 feet.

This race, and possibly another as yet undetermined, regularly winter in Panama. Individuals have been found at Barro Colorado at all seasons, but I have been unable to learn the basis of Griscom's statement (1935, p. 294, footnote) that the species has been found breeding in the Canal Zone. The Lerida specimen is the first of record from Chiriquí Province.

Accipiter bicolor bicolor (Vieillot). Bicolored Hawk.

Sparvius bicolor Vieillot, 1817, Nouv. Dict. Hist. Nat., nouv. éd., 10: 325—Cayenne.

Cedral: ♂, July 14, 1933. Gonads slightly enlarged. Altitude 4,800 feet.

Heretofore known in Bocas del Toro from a single specimen collected by Wedel at Fruitdale, Almirante Bay region, February 17, 1929.

Accipiter striatus velox (Wilson). Sharp-shinned Hawk.

Falco velox Wilson, 1812, Amer. Orn., 5: 116—Schuylkill River, near Philadelphia, Pennsylvania.

Quiel: immature ♂, October 24, 1937. Altitude 5,300 feet.

A specimen collected by Enrique Arcé on the southern slope of Volcán de Chiriquí in the late 1860's is the only previous record of this hawk in Panama. The species winters regularly in the highlands of Costa Rica.

Buteo jamaicensis costaricensis Ridgway. Red-tailed Hawk.

Buteo borealis var. *costaricensis* Ridgway, 1874, in Baird, Brewer and Ridgway, Hist. N. Amer. Bds., 3: 285—Costa Rica.

Chiquero: ♀, October 22. Horqueta: ♂, August 20. Lerida: 3 ♂, 4 ♀, May 11–October 22. Gonads slightly enlarged May 11–October 22. Altitude 5,000–5,600 feet.

Buteo swainsoni Bonaparte. Swainson's Hawk.

Buteo Swainsoni Bonaparte, 1838, Geog. Comp. List Bds. Europe and North America, p. 3—*ex* Audubon, pl. 372, "Colombia River"—Fort Vancouver, Washington.

Lerida: ♂, ♀, April 8, 1932. Altitude 5,800 feet.

The enormous flocks that migrate through Central America in April and October have been graphically described by several observers. The Lerida birds bring to a total of three the number of specimens actually collected in Panama.

Buteo platypterus platypterus (Vieillot). Broad-winged Hawk.

Sparvius platypterus Vieillot, 1823, Tabl. Enc. Meth. Orn., livr. 93, p. 1273—near Philadelphia, Pennsylvania.

Lerida: 3 ♂, ♀, October 29–January 1. Quiel: ♀, January 1. Gonads slightly enlarged October 29, January 1. Altitude 5,300 feet.

Leucopternis albicollis costaricensis W. L. Sclater. White Hawk.

Leucopternis gheisbreghtii costaricensis W. L. Sclater, 1919, Bull. Brit. Orn. Cl., 39: 76—Carrillo, Costa Rica.

Bajo Mono: ♀, October 31, 1936. Altitude 4,100 feet.

Essentially a bird of the forested lowlands but once observed as high as 4,500 feet on Boquete Trail, Bocas del Toro. I find no previous record of its occurrence on the Pacific slope of Volcán de Chiriquí.

Leucopternis princeps princeps Sclater. Barred Hawk.

Leucopternis princeps Sclater, 1865, Proc. Zool. Soc. London, 1865: 429, pl. 24—Tucurrique, Costa Rica.

Quiel: ♀, July 9, 1939. Gonads slightly enlarged. Altitude 5,000 feet.

The extreme rarity of this hawk is well known. In Panama it has been recorded previously only from Cebaco Island (Veraguas), Boquete Trail (Bocas del Toro), and Boquete. Except in length of tail (205 mm.), the Quiel specimen is distinctly larger than the Ecuadorian race (*zimmeri*) as characterized by Friedmann.

Spizastur melanoleucus (Vieillot). Black-and-white Hawk-Eagle.

Buteo melanoleucus Vieillot, 1816, Nouv. Dict. Hist. Nat., nouv. éd., 4: 482—Guiana.

Lerida: ♀, June 10, 1946. Velo: 2 ♂, May 26, 1932, and September 1, 1939. Altitude 5,200–5,400 feet.

This series almost doubles the number of specimens known from Panama, where the species had been previously reported only in Veraguas, at Lion Hill and on the Banana River. Since so conspicuous a bird is not likely to be overlooked, it is evident that this species is one of the rarest of Central American hawks.

Spizaëtus ornatus vicarius Friedmann. Ornate Hawk-Eagle.

Spizaëtus ornatus vicarius Friedmann, 1935, Jour. Wash. Acad. Sci., 25, no. 10, p. 451—Manatee Lagoon, Honduras.

Horqueta: ♂, September 10, 1932. Altitude 5,100 feet.

Spizaëtus tyrannus serus Friedmann. Black Hawk-Eagle.

Spizaëtus tyrannus serus Friedmann, 1950, Smiths. Misc. Coll., 111, no. 16, p. 1—Río Indio, Canal Zone, Panama.

Lerida: ♂, May 20, 1933. Altitude 5,400 feet.

The first specimen of record from Chiriquí. This bird, in white-throated subadult plumage, has heavily barred (not mainly whitish) under wing coverts, belly and thighs. I have been unable to compare it with *tyrannus* of comparable age.

Micrastur semitorquatus naso (Lesson). Collared Forest-Falcon.

Carnifex naso Lesson, 1842, Écho du Monde Sav., 6, sec. 2, col. 1085—Realejo, Nicaragua.

Lerida: ♀, December 5. Quiel: ♀, gonads slightly enlarged September 1. Altitude 5,300 feet.

There is but one previous record (Boquete) of this species in Chiriquí.

Falco sparverius sparverius Linnaeus. American Sparrow Hawk.

Falco sparverius Linnaeus, 1758, Syst. Nat., 10th ed., 1: 90—America=South Carolina.

Lerida: 2 ♂, 2 ♀, October 23–November 29. Altitude 5,300 feet.

Chamaepetes unicolor Salvin. Black Guan.

Chamaepetes unicolor Salvin, 1867, Proc. Zool. Soc. London, 1867: 159, 160—"Veragua"—Calovévora, Panama.

Bajo Mono: ♂, April 22. Cordillera: ♂, July 14. Lerida: 2 ♂, October 15. Río Caldera: 2 ♂, April 1, 6. Gonads enlarged April 1–22. Altitude 6,000–6,600 feet.

This guan is characteristic of the Subtropical Zone and undoubtedly is most abundant at high altitudes. Nevertheless, there is evidence that it occurs at low elevations both in Panama and in Costa Rica. A female in Chicago Museum was taken near Boquete by H. J. Watson at an altitude of 3,500 feet (April 3, 1903) and a male, collected on Cerro Santa Maria, Guanacaste, by Austin P. Smith is labeled 3,000 feet (October 19, 1930).

Odontophorus leucolaemus Salvin. White-throated Wood-Quail.

Odontophorus leucolaemus Salvin, 1867, Proc. Zool. Soc. London, 1867: 161—
Cordillera de Tolé, Veraguas, Panama.

Camp Cylindro: ♂, July 14. Camp Holcomb: ♀, June 26.
Gonads slightly enlarged. Altitude 5,000 and 5,200 feet.

This species has been reported on the Caribbean slope of Chiriquí but I find no record of its occurrence in Bocas del Toro. Both specimens are typical examples of the plumage phase characterized by an immaculate white throat, boldly barred breast, and black chest with concealed white spots and bars.

Odontophorus guttatus (Gould). Spotted Wood-Quail.

Ortyx guttata Gould, 1837 (1838), Proc. Zool. Soc. London, 5: 79—"Bay of Honduras."

Lerida: 3 ♂, June 1–December 7. Quiel: 2 ♀, May 7, June 27.
Gonads enlarged June 27; slightly enlarged May 7 and December 7.
Altitude 5,200–6,200 feet.

In view of considerable negative evidence I am not prepared to accept *matudae* of southeastern Chiapas as separable. On examination, each of its characters proves to be decidedly variable and either duplicated or approached in a large series of the nominate race now before me.

As unquestioned examples of *matudae* I have two males from Escuintla, Chiapas, a locality only a few miles distant from Mount Madre Vieja, the type locality. In the character of its throat streaks and ventral spotting one bird agrees perfectly with the description of the type. However, the second Escuintla specimen lacks the notably broad white throat streaks credited to *matudae* and in this respect differs not at all from *guttatus*. The white spots on the under parts of the second bird are tear-like but more rounded than in the first, and agree very well with the elliptical spotting not uncommon in *guttatus*. In color and pattern of the upper parts both Escuintla birds are indistinguishable from *guttatus*.

The variability both of throat streaking and of ventral spotting in this species is well illustrated by two adult December males taken at El Ocote (near Ocozocoantla), Chiapas, and hence referable to *guttatus*. One specimen has the narrow white throat streaks and round ventral spots characteristic of the nominate form; the second bird has even broader throat streaks than either of the Escuintla specimens ("*matudae*"), and ventral spots that are quite elliptical or tear-shaped. A black-throated Honduras specimen, in which minute

white streaks—hardly more than shaft lines—are restricted to the malar area, and a Campeche bird with conspicuously broadened gular streaks further emphasize the variability of this “character.”

A juvenile male (June 1) from Lerida, provisionally referred to *guttatus*, emphasizes the importance of collecting young birds with a parent to insure correct identification. This bird agrees in part with Friedmann's description of the erythristic phase but has an immaculate, creamy white throat, as has a considerably younger bird from Chiapas. Two Costa Rica juveniles in the Conover Collection, identified as *guttatus* and agreeing with that species in part, nevertheless are mutually so dissimilar as to extend the limits of variability beyond credibility.

Charadrius vociferus vociferus Linnaeus. Killdeer.

Charadrius vociferus Linnaeus, 1758, Syst. Nat., 10th ed., 1: 150—South Carolina.

Lerida: ♂, 2 ♀, October 31–December 13. Altitude 5,300 feet.

Capella gallinago delicata (Ord). Wilson's Snipe.

Scolopax delicata Ord, 1825, in reprint, Wilson, Amer. Orn., 9: cexviii—Pennsylvania.

Lerida: ♂, February 21. Altitude 5,300 feet.

Columba fasciata crissalis Salvadori. Band-tailed Pigeon.

Columba crissalis Salvadori, 1893, Cat. Bds. Brit. Mus., 21: 294—Boquete de Chitrá, Veraguas, Panama.

Lerida: ♂, ♀, March 3, November 23. Peña Blanca: ♂, November 11. Quiel: ♂, ♀, March 23, May 9. Gonads enlarged March 3–May 9. Altitude 5,200–6,800 feet.

The November male from Peña Blanca is molting and has only a few white feathers representing a collar, and a scattering of bronzy feathers on the hindneck. It is much duller below than breeding males but brighter and more purplish than females.

Columba subvinacea subvinacea (Lawrence). Ruddy Pigeon.

Chloroenas subvinacea Lawrence, 1868, Ann. Lyc. Nat. Hist. N. Y., 9: 135—Dota, Costa Rica.

Casita Alta: ♂, October 23. Horqueta: ♀, July 29. Lerida: 2 ♀, March 7, August 9. Peña Blanca: ♂, ♀, October 11. Gonads slightly enlarged August 9. Altitude 5,200–7,500 feet.

This pigeon occurs chiefly at intermediate altitudes, being replaced in the lowlands by *nigrirostris*, a bird of very similar appearance and habits. Both ruddy and band-tailed pigeons have been reported as low as 4,000 feet on Volcán de Chiriquí, but the latter is more essentially a Subtropical representative.

Columbigallina talpacoti rufipennis (Bonaparte). Ruddy Ground-Dove.

Chamaepelia rufipennis Bonaparte, 1855, Compt. Rend. Acad. Sci. Paris, 40: 22—Cartagena, Colombia.

Quiel: ♂, 2 ♀, October 24, November 8. Gonads slightly enlarged. Altitude 5,000–5,300 feet.

Claravis pretiosa (Ferrari-Perez). Blue Ground-Dove.

Peristera pretiosa Ferrari-Perez, 1886, Proc. U. S. Nat. Mus., 9: 175—Jalapa, Vera Cruz.

Horqueta: 3 ♂, 2 ♀, May 7–July 29. Lerida: ♂, October 24. Gonads enlarged May 7–July 29; slightly enlarged October 24. Altitude 5,000–5,300 feet.

Claravis mondetoura mondetoura (Bonaparte). Maroon-chested Ground-Dove.

Peristera mondetoura Bonaparte, 1856, Compt. Rend. Acad. Sci. Paris, 42: 765—Caracas, Venezuela.

Lerida: 2 ♀, July 22, December 5. Gonads slightly enlarged; ♂ juvenile, November 1. Altitude 5,300–6,400 feet.

I concur with Hellmayr and Conover in the opinion that the proposed races of southern Central America and northwestern South America are unrecognizable. Study of material now available reveals the characters thus far designated for *pulchra*, *umbrina*, and *inca* as merely manifestations of individual variation. While the status of the more northern races, *ochoterena* and *salvini*, is less certain, I have little confidence in either and consider the latter particularly suspect.

The juvenile collected November 1 has the appearance of a bird less than two months old. Its inner rectrices are grayish as in the adult male, and the feathers of the under parts narrowly edged with buff, not minutely freckled as in Ridgway's description.

Leptotila verreauxi verreauxi (Bonaparte). White-tipped Dove.

Leptotila verreauxi Bonaparte, 1855, Compt. Rend. Acad. Sci. Paris, 40: 99—Colombia.

Camiseta: juvenile, July 3. Horqueta: 2 ♂, May 9, 21. Lerida: ♂, ♀, May 26, November 2. Gonads enlarged May 9 and 26; slightly enlarged November 2. Altitude 5,300–6,000 feet.

Oreopeleia chiriquensis (Sclater). White-faced Quail-Dove.

Geotrygon chiriquensis Sclater, 1856, Proc. Zool. Soc. London, 24: 143—David, Chiriquí, Panama.

Camiseta: sex? July 3. Lerida: 3 ♂, 3 ♀, March 3–October 19. Velo: ♂, February 2. Gonads enlarged February 2–April 25. Altitude 5,300–6,000 feet.

I am much in favor of reducing monotypic species of limited distribution to subspecific rank when it is justified but I am following the traditional treatment of *chiriquensis* as a full species in the belief that Hellmayr underestimated the value of its distinctive characters. Field studies are needed to clarify the relationship of *albifacies*, *chiriquensis*, and *linearis*, but on present evidence I consider Peters' treatment more realistic than any of the others.

In Panama, *chiriquensis* is restricted to the western portion of the Pacific slope, where, unlike the Costa Rica population, it occurs both at sea level (David, Calobre, etc.) and at very high altitudes (10,000 feet).

Aratinga finschi (Salvin). Crimson-fronted Parakeet.

Conurus finschi Salvin, 1871, Ibis, p. 91, pl. 4—Bugaba, Chiriquí, Panama.

Lerida: ♂, ♀, sex? November 23. Quiel: ♂, ♀, November 15. Gonads slightly enlarged November 23. Altitude 5,000–5,300 feet.

In Chiriquí *finschi* has been reported only at Divalá and Bugaba, both in the lowlands. Griscom includes both coastal slopes of western Panama in its range, but unfortunately mentions no localities.

Pyrrhura hoffmanni gaudens Bangs. Sulphur-winged Parakeet.

Pyrrhura hoffmanni gaudens Bangs, 1906, Proc. Biol. Soc. Wash., 19: 103—Boquete, Chiriquí, Panama.

Chiquero: ♂, ♀, November 2. Cordilleras: ♂, May 12. Lerida: ♂, ♀, June 13. Gonads enlarged May 12. Altitude 5,100–6,500 feet.

A male in breeding condition has yellowish streaks on its crown but the occiput lacks the red-tipped feathers indicative of full maturity. Immature *gaudens* and *hoffmanni* are virtually indistinguishable.

Bolborhynchus lineola lineola (Cassin). Barred Parakeet.

Psittacula lineola Cassin, 1853, Proc. Acad. Nat. Sci. Phila., 6: 372—National Bridge, Mexico=Puente Nacional, Vera Cruz.

Lerida: ♂, ♀, December 6, 22, 1939. Gonads slightly enlarged. Altitude 5,500 feet.

This parakeet is uncommon to rare throughout its range. Two males collected at 2,000 feet(?) on the Caribbean slope of Volcán de Chiriquí by W. W. Brown, June 12, 1901, appear to be the only previous records for Panama. Although traditionally credited to the Subtropical Zone, *lineola* has also been found as low as 2,000 feet in Costa Rica (Angostura).

Pionopsitta haematotis haematotis (Scalater and Salvin). Brown-hooded Parrot.

Pionus haematotis Scalater and Salvin, 1860, Proc. Zool. Soc. London, 1860: 300—Vera Paz, Guatemala.

Peña Blanca: ♂, August 15. Gonads enlarged. Altitude 6,200 feet.

Two of seven birds from Divalá, in the Chiriquí lowlands, were found by Peters (1931, p. 313) to have certain characters of *coccini-collaris*, the very distinctive race of eastern Panama. The Mönniche specimen is wholly typical of the nominate race, as are two birds from Cricamola on the Caribbean coast.

This widespread parrot has seldom been reported in Panama, but to the northward it occurs commonly in humid lowland forests to an altitude of 3,000 feet. I find no previous reference to its presence at altitudes exceeding 5,000 feet.

Coccyzus erythrophthalmus (Wilson). Black-billed Cuckoo.

Cuculus erythrophthalma [sic] Wilson, 1811, Amer. Orn., 4: 16, pl. 28, f. 2—near Philadelphia, Pennsylvania.

Lerida: ♂, October 16, 1938. Gonads slightly enlarged. Altitude 5,300 feet.

This species has been reported as a migrant in the Canal Zone and in Darien, but apparently never before in western Panama and seldom elsewhere in Central America.

Piaya cayana thermophila P. L. Scalater. Squirrel Cuckoo.

Piaya thermophila P. L. Scalater, 1859, Proc. Zool. Soc. London, 1859: 368—tierra caliente of Mexico and Guatemala=Jalapa, Vera Cruz, Mexico.

Lerida: ♂, sex? June 10 and November 11. Velo: ♂, 3 ♀, May 26–September 16. Gonads enlarged June 10, 18; slightly enlarged September 16. Altitude 5,200–6,700 feet.

The characters of *incincta* are decidedly variable, and, in my opinion, of no geographic significance. In any case, birds from the Pacific slope of western Panama agree in every respect with *thermophila* as represented by several score more northern specimens now before me.

Squirrel cuckoos occur on both coastal slopes of Costa Rica to an altitude of 6,500 feet, but hitherto none has been reported in Panama above 4,000 feet. Only one Mönniche specimen (November 11) was taken above 5,300 feet.

Crotophaga ani Linnaeus. Smooth-billed Ani.

Crotophaga ani Linnaeus, 1758, Syst. Nat., 10th ed., 1: 105—America, Africa=Jamaica.

Velo: ♂, November 11, 1932. Altitude 5,200 feet.

It is interesting that this conspicuous resident has been reported in western Panama only in fall and winter (November 11–January 22). Only one of the five previous Chiriquí localities of record (Barriles) is as much as 4,200 feet above sea level.

Tyto alba guatemalae (Ridgway). Barn Owl.

Strix flammea var. *Guatemalae*, 1873, Ridgway, Bull. Essex Inst., 5: 200—Chinandega, Nicaragua.

Quiel: ♂, October 13, 1938. Gonads enlarged. Altitude 5,100 feet.

This owl has seldom been reported in Panama and virtually nothing is known of its status. The Mönniche specimen is the first of record from the vicinity of Volcán de Chiriquí, if not from the entire province.

Ciccaba virgata centralis Griscom. Mottled Owl.

Ciccaba virgata centralis Griscom, 1929, Bull. Mus. Comp. Zool., 69: 159—Chivela, Oaxaca.

Lerida: 3 ♂, ♀, October 1–November 26. Quiel: ♂, ♀, April 7, June 29. Gonads slightly enlarged April 7, June 29. Altitude 5,300–5,500 feet.

Both sexes, in both light and dark color phases, are represented in this series. One of the most common forest owls in the region.

Ciccaba huhula nigrolineata Sclater. Black-and-white Owl.

Ciccaba nigrolineata Sclater, 1859, Proc. Zool. Soc. London, 1859: 131—southern Mexico=Oaxaca.

Quiel: ♂, August 28, 1937. Altitude 5,200 feet.

C. nigrolineata and the equally distinctive wood owl, *C. huhula*, of northern South America east of the Andes are either wholly or essentially allopatric and traditionally have been treated as monotypic species. That the two are, in reality, more closely related is suggested by the composite appearance of the bird once known as *Syrnium* [= *Ciccaba*] *spilonotum* (type locality "Bogota"), a present synonym of *nigrolineata*.

The incidence, in east-central Colombia, of birds referable to "*spilonotum*" points to a close genetic bond between *nigrolineata* and *huhula*. Of special interest is a specimen taken at Belén, Caquetá, where the respective ranges might be expected to meet. This bird, in the pattern of its upper parts, is indistinguishable from *huhula*, yet the barring of the under parts agrees in every respect with *nigrolineata* as represented by the "*spilonotum*" plumage phase.

The concept of a single species with two well-marked races that tend to merge in Colombia is further strengthened by a second example of apparent intermediacy in Chicago Natural History Museum. This specimen, from Río Barrero, Colombia, has certain characters of "*spilonotum*" and was so listed by Cory (1918, p. 35). However, on examining this bird critically I find that it differs considerably from the accepted concept of "*spilonotum*," especially in the barring of the under parts, and in several respects it approaches *huhula*.

Nyctidromus albicollis albicollis (Gmelin). Pauraque.

Caprimulgus albicollis Gmelin, 1789, Syst. Nat., 1, pt. 2, p. 1030—Cayenne.

Lerida: ♂, 2 ♀, October 21–28. Peña Blanca: ♂, March 22. Gonads enlarged March 22. Altitude 5,300–6,000 feet.

Caprimulgus carolinensis Gmelin. Chuck-Will's-Widow.

Caprimulgus carolinensis Gmelin, 1789, Syst. Nat., 1, pt. 2, p. 1028—Virginia and Carolina=South Carolina, *ex* Catesby.

Bajo Mono: ♀, March 3, 1932. Lerida: ♂, October 16, 1937. Altitude 5,100–5,300 feet.

Only twice before recorded on the Volcán de Chiriquí massif, where presumably it is a yearly visitant.

Caprimulgus saturatus (Salvin). Dusky Nightjar.

Antrostomus saturatus Salvin, 1870, Proc. Zool. Soc. London, 1870: 203—
Volcán de Chiriquí, Panama.

Volcán de Chiriquí: ♀, August 31, 1937. Altitude 10,200 feet.

In Panama this form is uncommon to rare and has been found only on Volcán de Chiriquí where Arcé collected the type on the southern slope at an altitude not exceeding 6,500 feet. In Costa Rica, where it is more abundant, *saturatus* has been reported from 5,000 to 10,000 feet above sea level.

Chaetura vauxi richmondi Ridgway. Vaux's Swift.

Chaetura richmondi Ridgway, 1910, Proc. Biol. Soc. Wash., 23: 53—Guayabo, Costa Rica.

Bajo Mono: ♂, November 3, 1932. Lerida: ♂, September 21, 1936. Altitude 5,300–5,800 feet.

These specimens agree in every respect with a series of *richmondi* from Guatemala, El Salvador, and Costa Rica. I have seen no examples of the Azuero Peninsula race, *ochropygia*, which is presumed to intergrade with *richmondi* in Chiriquí.

The status of this swift in Panama has until now been uncertain since the only previous record for the country is questionable. Both Ridgway and Griscom included western Panama in the range of *richmondi*, apparently on the authority of Salvin (1889, p. 367), whose reference, under *Chaetura gaumeri*, to a Chiriquí specimen "differing in no way from Cozumel birds" does not inspire confidence. This early record was not accepted by Peters, who specified Costa Rica as the southernmost limits of *richmondi*. The Mönniche specimens are thus the first authentic records from Panama.

Threnetes ruckeri ventosus Bangs and Penard. Band-tailed Barbthroat.

Threnetes ruckeri ventosus Bangs and Penard, 1924, Occ. Papers Boston Soc. Nat. Hist., 5: 77—Pozo Azul, Costa Rica.

Cordillera (Bocas del Toro): ♂, June 26, 1933. Gonads slightly enlarged. Altitude 5,000 feet.

The discovery of this hummingbird at a high altitude on the northern slope of the central range is unexpected. In Panama the species is found chiefly in the Pacific lowlands but nevertheless is reputed to occupy both slopes of Chiriquí(!) and Veraguas.

Phaethornis guyi coruscus Bangs. Green Hermit.

Phaethornis guyi coruscus Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 26—
Boquete, 4,500 feet, southern slope of Volcán de Chiriquí, Panama.

Cordillera (Chiriquí): ♀, June 26. Horqueta: 3 ♂, ♀, May 16.
Velo: ♂, May 9. Gonads enlarged May 16. Altitude 5,000–5,300
feet.

Eutoxeres aquila salvini Gould. White-tipped Sicklebill.

Eutoxeres Salvini Gould, 1868, Ann. Mag. Nat. Hist., (4), 1: 456—Veragua,
Panama.

Camp Holcomb: ♂, July 15, 1933. Gonads enlarged. Altitude
5,000 feet.

In Panama this rare bird has previously been found only in the lowlands and foothills of Veraguas, the scene of extensive collecting over a period of many years. Its discovery in Bocas del Toro is not unexpected, however, since in Costa Rica *salvini* is most numerous on the Caribbean slope. Additional field work in Bocas del Toro obviously is much needed and can be expected to clarify many present distributional discrepancies.

Campylopterus hemileucurus mellitus Bangs. Violet Sabrewing.

Campylopterus hemileucurus mellitus Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 28—Boquete, 4,800 feet, southern slope of Volcán de Chiriquí, Panama.

Chiquero: 2 ♂, October 16, November 7. Cordilleras: ♀, May 14.
Horqueta: ♂, ♀, June 18, July 29. Lerida: 5 ♂, ♀, June 28–October 10. Quebrada Velo: 5 ♂, May 2–November 23. Quiel: ♂, ♀, October 13, 18. Gonads enlarged March 26–June 18. Altitude 5,100–6,500 feet.

Bangs originally referred to *mellitus* as a “very well marked race, at once distinguished [from *hemileucurus*] by its larger size, longer bill” and various color differences. Peters recognized the southern form without comment, although it was not accorded a place in Griscom’s 1935 report on the ornithology of Panama.

In comparing the Mönniche birds with a much larger series from southern Mexico I find no differences of color and, indeed, very little other basis for the describer’s enthusiasm. Except in length of bill, the measurements of northern and southern birds completely overlap. Nevertheless, I am inclined to recognize *mellitus* by reason of slightly

but consistently longer bill, as evidenced by the following measurements of the exposed culmen: *mellitus*: 10 ♂, 29–31 mm. (30 mm.); *hemileucurus*: 10 ♂, 27–28 mm. (27.4 mm.).

Florisuga mellivora (Linnaeus). White-necked Jacobin.

Trochilus mellivorus Linnaeus, 1758, Syst. Nat., ed. 10, 1: 121—India (error= Surinam, *ex* Edwards, p. 35, pl. 35, upper fig.).

Quiel: 3 ♂, ♀, November 7, 8. Gonads slightly enlarged. Altitude 5,000 feet.

Colibri delphinae (Lesson). Brown Violet-Ear.

Ornismya Delphinae Lesson, 1839, Rev. Zool., p. 44—Santa Fé de Bogotá, Colombia (designated by Berlepsch and Hartert, 1902).

Lerida: ♂, ♀, January 24 and November 1. Quiel: ♂, November 7. Gonads enlarged January 24. Altitude 5,000–5,300 feet.

Apparently rare in Panama, where previously reported only in Veraguas (Pico Calovévora) and Darien (Cana).

Colibri thalassinus cabanidis (Heine). Green Violet-Ear.

Petasophora Cabanidis Heine, 1863, Jour. f. Orn., 11: 182—Costa Rica.

Alto de Chiquero: ♀, May 13. Lerida: 15 ♂, March 17–November 26. Quiel: 2 ♂, ♀, November 15. Velo: 2 ♀, May 24 and November 15. Gonads enlarged March 17–November 26. Altitude 5,000–6,200 feet.

Panterpe insignis Cabanis and Heine. Fiery-throated Hummingbird.

Panterpe insignis Cabanis and Heine, 1860, Mus. Hein., Th. 3: 43, note—Costa Rica.

Cordillera (Bocas del Toro): ♂, ♀, July 13. Cordilleras (Chiriquí): ♂, 2 ♀, June 26 and November 7. Copete (peak): ♂, ♀, July 5. Fila Lerida: 2 ♂, sex? July 24, 29. Volcán: 2 ♂, July 28. Gonads enlarged June 26–July 28. Altitude 6,000–10,200 feet.

Amazilia edward niveoventer (Gould). White-bellied Hummingbird.

Trochilus (?) *niveoventer* Gould, 1850 (1851), Proc. Zool. Soc. London, pt. 18, 1850: 164—David, Panama.

Horqueta: 2 ♂, ♀, May 10. Jarramilla (Boquete): ♂, May 14. Lerida: 11 ♂, 10 ♀, March 20–December 2. Quiel: 2 ♂, ♀, Novem-

ber 7, 25. Velo: ♂, June 24. Gonads enlarged March 20–October 24. Altitude 4,000–5,500 feet.

A single specimen of this series was taken below 5,000 feet (Jarra-milla). Although most numerous at medium elevations, *niveoventer* has also been found at sea level on the Azuero Peninsula in February and at 1,500 feet in March.

Amazilia tzacatl tzacatl (de la Llave). Rufous-tailed Hummingbird.

Trochilus Tzacatl de la Llave, 1833, Registro Trimestre, 2, no. 5, p. 48—Mexico.

Lerida: 2 ♂, ♀, sex? September 24–November 25. Gonads slightly enlarged. Altitude 5,200–5,300 feet.

Eupherusa eximia egregia Sclater and Salvin. Stripe-tailed Hummingbird.

Eupherusa egregia Sclater and Salvin, 1868, Proc. Zool. Soc. London, 1868: 389—Castello and Calovévora, Panama.

Horqueta: ♀, May 21. Lerida: 4 ♂, ♀, March 20–October 27. Quiel: ♂, November 7. Altitude 5,000–5,400 feet.

Eupherusa nigriventris Lawrence. Black-bellied Hummingbird.

Eupherusa nigriventris Lawrence, 1867, Proc. Acad. Nat. Sci. Phila., p. 232—Costa Rica.

Camp Holcomb: ♂, July 15, 1935. Gonads slightly enlarged. Altitude 5,000 feet.

The first specimen of record from Bocas del Toro.

Elvira chionura (Gould). White-tailed Emerald.

Trochilus (Thaumatias?) chionura Gould, 1850 (1851), Proc. Zool. Soc. London, pt. 18, 1850: 162—David, 2,000–3,000 feet, Chiriquí, Panama.

Chiquero: ♀, March 25. Horqueta: ♂, May 21. Lerida: 4 ♂, 2 ♀, October 2–November 23. Velo: ♂, ♀, June 18. Gonads slightly enlarged November 23. Altitude 5,100–5,500 feet.

Peters mistakenly restricted this species to Panama, although its presence in Costa Rica is fully authenticated. The relationship of *chionura* and *cupreiceps* invites further inquiry by reason of two atypical males in Chicago Natural History Museum. One, possibly a hybrid, was taken in Chiriquí, much beyond the range of *cupreiceps* as presently known. It agrees with *cupreiceps* in the coloring of the

upper parts, but has the black-tipped tail of *chionura* and a white median line on the belly. The throat and breast are heavily flecked with bright copper-bronze, unlike either *chionura* or *cupreiceps*. The second specimen, from Guayabo, Costa Rica, obviously is referable to *cupreiceps* but differs from typical examples in having the rectrices broadly tipped with black as in *chionura*.

Lampornis calolaema (Salvin). Purple-throated Mountain-Gem.

Oreopyra calolaema Salvin, 1864 (1865), Proc. Zool. Soc. London, 1864: 584—
"Volcán de Cartago," i.e. Volcán de Irazú, Costa Rica.

Boquete: ♂, July 1. Velo: ♂, October 29. Gonads slightly enlarged July 1. Altitude 5,400–5,600 feet.

My views on the relationship of *calolaema*, *castaneiventris*, and *cinereicauda* are diametrically opposed to those of Berlioz (1949), who attributes their differences to polymorphism. In my opinion, each is a distinct form, more or less closely related to the others, as set forth in the following pages.

The Mönniche specimens agree in minute detail with a series of Costa Rica males and dispel any remaining doubt that *calolaema* is resident southward to the mountains of western Panama. The presence of this hummingbird on Volcán de Chiriquí, where *L. castaneiventris* also occurs in great abundance, not only tends to validate previous Panama records (Cordillera de Tolé, Cordillera del Chucu, Volcán de Chiriquí, Calovévora, Calobre, Veraguas) questioned by Peters, but also eliminates the concept of a subspecific relationship.

Lampornis calolaema × **castaneiventris**

Quebrada Velo: ♂, March 2, 1933. Altitude 5,400 feet.

The modified characters of both *calolaema* and *castaneiventris* are evident in this specimen, which has the appearance of being a hybrid. The violet of the throat, which presumably reflects the influence of *calolaema*, is considerably diluted and becomes barely perceptible as a vague gloss medially and anteriorly where the feathers are tipped with buff or pale brown. Immediately below the feather tips, which provide the throat coloring, each feather is distinctly whitish (not dusky as in typical *calolaema*), but much less purely white than is characteristic of *castaneiventris*.

Ridgway's description (1911, p. 503) of an unusual type of throat coloring found in some specimens from the immediate vicinity of Volcán de Chiriquí approximates the condition of the Mönniche bird.

While Ridgway referred his atypical birds to *castaneiventris*, it is significant that he ignored Salvin's reference (1870, p. 205) to the occurrence of *calolaema* on Volcán de Chiriquí, although conceding its presence elsewhere in western Panama beyond the range of *castaneiventris*. As closely related species, sympatric in part, occasional hybridization between *calolaema* and *castaneiventris* is likely, and in my opinion accounts for the rare type of throat coloring that heretofore has been dismissed as evidence of variability in *castaneiventris*.

The characters of both species are, in fact, remarkably stable. A series of male *calolaema* from Costa Rica, where *castaneiventris* does not occur, shows virtually no variation in throat coloring, and none tending toward *castaneiventris*. Of the 38 males from Volcán de Chiriquí examined, 35 deviate in no way from *castaneiventris* as traditionally characterized, two specimens are as readily referable to *calolaema*, and but one (hybrid?) is not characteristic of either.

Lampornis castaneiventris castaneiventris (Gould). White-throated Mountain-Gem.

Trochilus (?) *castaneiventris* Gould, 1850 (1851), Proc. Zool. Soc. London, pt. 18, 1850: 163—Cordillera de Chiriquí, 6,000 feet, Panama.

Alto de Chiquero: 5 ♂, 4 ♀, February 1–October 11. Bajo Mono: ♂, ♀, March 23 and November 17. Cordillera (Bocas del Toro): ♀, July 13. Cordilleras (Boquete): 5 ♂, 3 ♀, May 15. Horqueta: ♂, June 18. Lerida: 7 ♂, 2 ♀, May 13–December 2. Quebrada Velo: ♂, June 15. Quiel: 2 ♂, February 5 and March 3. Velo: 13 ♂, 4 ♂, sex? February 23–October 29. Gonads enlarged May–November; slightly enlarged December 2–February 23. Altitude 5,200–6,800 feet.

I am unable to distinguish between the females of *calolaema* and *castaneiventris*, so have listed under the latter, by far the more abundant of the two in Panama, all specimens that may belong to either.

The present certainty that both birds coexist on Volcán de Chiriquí, if not more widely, clearly obviates the concept of their conspecificity. I find no evidence in support of the opinion held by some that the two merely represent the diverse plumages of a single form. If my premises are conceded, the affinities of *cinereicauda* can profitably be reconsidered. This form is strikingly similar to *castaneiventris*, from which it differs only in the color of the tail. Although a closer relationship between these birds seems obvious, they hitherto have been treated as distinct species by reason of the

fact that *calolaema* co-exists with *cinereicauda* in Costa Rica and of necessity has been considered a race of *castaneiventris* (Peters, 1945, p. 83, footnote 3).

A basic objection to the recognition of *cinereicauda* as a geographical representative of *cinereiventris* rests on the reputed occurrence of both on Volcán de Chiriquí. Their sympatric relationship is widely accepted, but requires verification. Peters (loc. cit.), recognizing this, wisely restricted the range of *cinereicauda* to Costa Rica, where its occurrence is well documented. Thus, it is now possible and in my opinion desirable to merge *cinereicauda* and *cinereiventris* in a single species and formalize their close relationship.

***Heliodoxa jacula henryi* Lawrence.** Green-crowned Brilliant.

Heliodoxa henryi Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 18: 402—
Angostura, Costa Rica.

Bajo Mono: ♀, March 22. Velo: ♀, June 15. Altitude 5,200, 5,300 feet.

Reported as much as 7,500 feet above sea level on Volcán de Chiriquí, but most numerous at lower altitudes in the adjacent foothills.

***Eugenes fulgens spectabilis* (Lawrence).** Magnificent Hummingbird.

Heliomaster spectabilis Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 8: 132—
Chiriquí, Panama.

Velo: ♂, December 6, 1932. Gonads slightly enlarged. Altitude 5,300 feet.

Previously reported in Panama (Volcán de Chiriquí) only at altitudes exceeding 6,000 feet. Although essentially a bird of the higher mountains, stragglers have been found as low as 5,000 feet in Costa Rica, where apparently the bird is much more abundant than in Panama.

***Heliothryx barroti* (Bourcier).** Purple-crowned Fairy.

Trochilus Barroti Bourcier, 1843, Rev. Zool., p. 72—Cartagena, Colombia.

Alto de Chiquero: ♂, ♀, May 1 and October 11. Lerida: ♂, 3 ♀, July 1–October 13. Gonads enlarged May 1 and October 13. Altitude 5,300–5,400 feet.

This species has been taken up to 7,000 feet above sea level on the Pacific slope of Volcán de Chiriquí, but elsewhere is restricted almost solely to the humid Tropical Zone.

These birds, and many others of the Mönniche collection, reveal how largely erroneous are our present concepts of the zonal affinities of tropical species. Some, traditionally considered Subtropical representatives, prove to be equally common in the lowlands. Others, generally conceded to be characteristic of the Tropical Zone, nevertheless may be found at high altitudes even during the breeding season. Until much more is known about Middle American birds, extreme caution obviously should be exercised in assigning zonal representatives.

***Selasphorus flammula* Salvin.** Rose-throated Hummingbird.

Selasphorus flammula Salvin, 1864, Proc. Zool. Soc. London, 1864: 586—
Volcán de Cartago, i.e. Volcán de Irazú, Costa Rica.

Casita Alta: 3 ♂, October 9. Lerida: ♀, November 5. Volcán: ♂, August 12. Gonads slightly enlarged August 12. Altitude 6,800–10,200 feet.

Berlioz (1949, pp. 5–6) has discussed adequately the polymorphic nature of this species, and evidence that it commonly finds expression in a plumage phase represented by the bird previously known as *torridus* Salvin. Rose-throated hummingbirds are uncommon below timber-line and in Panama have hitherto been reported only above 10,000 feet.

It is interesting that birds with distinctly reddish-purple gorgets (*flammula*, as traditionally known) appear to be restricted to Costa Rica, while the striking variant (“*torridus*”) occurs both in Costa Rica and on Volcán de Chiriquí. As Berlioz noted, the gorget of “*torridus*” is remarkably variable. This is well illustrated by the four males listed above, none of which, however, have the reddish-purple gorget by which *flammula* was distinguished in the past.

***Selasphorus scintilla* (Gould).** Scintillant Hummingbird.

Trochilus (Selasphorus) scintilla Gould, 1850 (1851), Proc. Zool. Soc. London, 1850: 162—Volcán de Chiriquí, 9,000 feet, Panama.

Alto de Chiquero: ♀, immature, March 24. Lerida: 10 ♂, 12 ♀, March 17–December 2. Quiel: 2 ♂, ♀, May 25, November 15. Velo: ♂, ♀, April 5, June 24. Gonads enlarged September 24–November 25; March 3. Altitude 5,000–6,400 feet.

Evidence of a fall and winter breeding period suggested by the above dates of gonadal activity is verified by three nests with incubating eggs collected by Mr. Mönniche on November 4 and De-

ember 12, 1932. Descriptions of these and other Volcán de Chiriquí nests and eggs have been published (Blake, 1956).

Pharomachrus mocino costaricensis Cabanis. Quetzal.

Pharomachus costaricensis Cabanis, 1869, Jour. f. Orn., 17: 313—Costa Rica.

Alto de Chiquero: 2 ♂, ♀, March 13–April 10. Bajo Mono: 2 ♂, March 25, 28. Lerida: ♂, May 10. Río Caldera: 2 ♂, March 14 and May 2. Velo: ♂, February 26, 1952. Gonads enlarged. Altitude 5,500–6,800 feet.

Quetzals have been found as low as 4,000 feet on Volcán de Chiriquí but usually they frequent much higher altitudes. The most recent Mönniche specimen was taken at Alto de Chiquero in February, 1952; the others were taken prior to 1940.

Trogon collaris puella Gould. Bar-tailed Trogon.

Trogon puella Gould, 1845, Proc. Zool. Soc. London, pt. 13, 1845: 18—Escuintla, "South America"—Guatemala.

Bajo Mono: ♀, June 18. Camp Cylindro: ♂, July 16, 1933. Cordilleras: ♂, May 12. Lerida: ♂, ♀, October 23. Gonads enlarged May 12–July 16. Altitude 5,300–6,500 feet.

The Camp Cylindro specimen is the first of record from Bocas del Toro.

Trogon aurantiiventris aurantiiventris Gould. Orange-bellied Trogon.

Trogon aurantiiventris Gould, 1856, Proc. Zool. Soc. London, pt. 24, 1856: 107—near David, Panama.

Alto de Chiquero: 2 ♂, 2 ♀, February 27–November 10. Bajo Mono: ♂, October 11. Camp Cylindro: ♀, sex? July 14. Camp Holcomb: ♂, July 14. Lerida: 3 ♂, 3 ♀, February 20–December 13. Quiel: 2 ♂, ♀, February 24 and November 25. Gonads enlarged February 20–July 14. Altitude 5,100–6,600 feet.

Chloroceryle americana isthmica (Goldman). Green Kingfisher.

Ceryle americana isthmica Goldman, 1911, Smiths. Misc. Coll., 56, no. 27, p. 1—Rio Indio, near Gatun, Canal Zone.

Horqueta: 2 ♂, ♀, April 5–July 26. Gonads enlarged April 5. Altitude 5,200–5,300 feet.

Electron platyrhynchum minor (Hartert). Broad-billed Motmot.

Prionirhynchus platyrhynchus minor Hartert, 1898, Nov. Zool., 5: 498—Panama.

Cedral: ♂, July 14, 1933. Altitude 4,800 feet.

Momotus momota lessonii Lesson. Blue-crowned Motmot.

Momotus lessonii Lesson, 1842, Rev. Zool., p. 174—Realejo, Nicaragua.

Alto de Chiquero: ♂, November 10. Horqueta: ♀, April 5. Lerida: 3 ♂, ♀, immature, January 13–September 23. Quiel: 2 ♂, February 19 and June 25. Gonads enlarged February 19–June 17. Altitude 5,200–6,000 feet.

Eubucco bourcierii salvini (Shelley). Red-headed Barbet.

Capito salvini Shelley, 1891, Cat. Bds. Brit. Mus., 19: 108 (in key), 119, pl. 5, f. 4—Costa Rica to Chiriquí.

Alto de Quiel: ♀, October 15. Horqueta: 2 ♂, May 16 and July 25. Lerida: ♂, ♀, March 7 and December 16. Gonads enlarged March 7–May 16. Altitude 5,200–5,500 feet.

This species and the following occur only at medium altitudes in western Panama, but in Costa Rica both occupy the lowlands (above 1,000–1,500 feet) as well as the Subtropical forests. This pattern of distribution is repeated so frequently, especially among birds restricted to these countries, that it cannot be explained solely as evidence of fortuitous collecting.

Semnornis frantzii (Sclater). Prong-billed Barbet.

Tetragonops frantzii Sclater, 1864, Ibis, p. 371, pl. 10—near San José, Costa Rica.

Bajo Mono: 3 ♂, May 19–October 10. Cordilleras: 3 ♂, 2 ♀, May 12–November 19. Horqueta: ♂, ♀, June 18 and September 2. Gonads enlarged May 12–September 2. Altitude 5,200–6,600 feet.

Although I am here accepting the generic terminology that has been favored since 1900, it nevertheless is incumbent upon me to point out that *Pan* Richmond, 1899, not only has prior claim to recognition, but also may shortly become incontrovertibly available unless appropriate steps are taken to exclude *Pan*, of all authors, from further zoological use.

By way of elaboration, it will be recalled that *Semnornis* Richmond, 1900, first came into being as a result of the discovery that

Pan Richmond, 1899, was preoccupied by *Pan* Oken, 1816, a mammal. Names published in Oken's *Lehrbuch der Naturgeschichte* (1815-16) have long been in disfavor for obvious reasons. Recently, in discussing the availability of Oken's names, Heming (1954, pp. 200-201) concluded that they are fundamentally without status, since Oken's system does not conform to the principles of binominal nomenclature. With this one must agree. In the likely event that Heming's major premise is accepted by the International Commission on Zoological Nomenclature it follows that *Pan* Richmond, 1899, will thereupon automatically replace *Semnornis* as the correct generic designation of this and related species, in as much as the Commission's action relating to Oken will in no way invalidate Richmond.

Aulacorhynchus prasinus maxillaris Griscom. Emerald Toucanet.

Aulacorhynchus caeruleogularis maxillaris Griscom, 1924, Amer. Mus. Nov., no. 141, p. 2—Guayabo, Costa Rica.

Casita Alta: ♀, March 9. Lerida: ♂, March 9. Quiel: ♂, June 29. Gonads enlarged. Altitude 5,300-6,800 feet.

One Mönniche specimen, as well as three Costa Rican birds in a series of sixteen, lacks the dark red prealar spot on the maxilla that serves in part to distinguish *maxillaris* from *caeruleogularis* of eastern Chiriquí and Veraguas. I nevertheless recognize *maxillaris*, pending a more thorough analysis of this and other characters.

Pteroglossus torquatus frantzii Cabanis. Collared Araçari.

Pteroglossus Frantzii Cabanis, 1861, Sitzungsber. Nat. Ges. Freunde Berlin, Nov.—Aguacate, Costa Rica.

Velo: ♀, September 5. Altitude 5,300 feet.

An essentially lowland bird, restricted to the Pacific slope and not previously reported in Panama above an altitude of 3,000 feet.

Selenidera spectabilis Cassin. Yellow-eared Toucanet.

Selenidera spectabilis Cassin, 1857, Proc. Acad. Nat. Sci. Philadelphia, p. 214—Cucuyos de Veragua, Panama.

Cedral: immature ♀, July 14. Altitude 4,800 feet.

This toucan is uncommon to rare wherever found and is virtually unknown at altitudes exceeding 3,500 feet.

Picus rubiginosus uropygialis (Cabanis). Golden-olive Woodpecker.

Chloronerpes uropygialis Cabanis, 1862, Jour. f. Orn., 10: 321—Cerro de la Candelaria, Costa Rica.

Horqueta: ♀, May 9. Lerida: 2 ♂, March 5 and June 14. Quiel: ♂, November 12. Velo: ♂, October 3. Gonads enlarged March 6–June 14. Altitude 5,200–5,400 feet.

Melanerpes formicivorus striatipectus Ridgway. Acorn Woodpecker.

Melanerpes formicivorus var. *striatipectus* Ridgway, 1874, in Baird, Brewer and Ridgway, Hist. N. Amer. Bds., 2: 561, note—Birris, Costa Rica.

Casita Alta: ♂, October 30. Lerida: 4 ♂, ♀, June 27–November 23. Peña Blanca: ♀, September 16. Quiel: ♂, June 25. Gonads enlarged June 27–September 16. Altitude 5,300–7,400 feet.

Centurus rubricapillus rubricapillus Cabanis. Red-crowned Woodpecker.

Centurus rubricapillus Cabanis, 1862, Jour. f. Orn., 10: 328—Barranquilla, Colombia.

Horqueta: ♂, May 16. Lerida: ♂, 2 ♀, March 19–September 21. Quiel: ♂, ♀, September 17 and December 15. Gonads enlarged March 19–May 16. Altitude 5,200–5,500 feet.

These birds agree both with a large series from eastern Panama (Colon), northern Colombia and western Venezuela, and with the five examples of *costaricensis* at my disposal. The Costa Rican race is characterized as a smaller bird with paler, more olive (less ochraceous gray) under parts, and less extensive red abdominal patch. In the absence of a wholly representative series of *costaricensis* I cannot now evaluate its color characters with finality. Their duplication in more southern birds obviously weakens the concept of a separable population showing absolute color differences, but it is conceded that in a large series from Costa Rica an average color distinction possibly can be demonstrated.

The measurements of Costa Rica birds largely overlap those of the nominate form as otherwise represented, but the latter admittedly averages slightly larger than *costaricensis*. In my opinion, however, the Costa Rica form requires verification. Measurements in millimeters (both sexes): *costaricensis*, wing 105.4–113 (109.5), tail 48.3–54.7 (51.2); *rubricapillus*, wing 107.1–115.2 (110.3), tail 50.6–55.1 (52.2).

Veniliornis fumigatus sanguinolentus (Sclater). Smoky-brown Woodpecker.

Chloronerpes sanguinolentus Sclater, 1859, Proc. Zool. Soc. London, pt. 27, 1859: 60, pl. 151—Omoa, Honduras.

Peña Blanca: ♂, August 15. Gonads enlarged. Altitude 6,200 feet.

Dendrocopos villosus extimius (Bangs). Hairy Woodpecker.

Dendrocopos villosus extimius Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 33—Boquete, 6,000 feet, Volcán de Chiriquí, Panama.

Casita Alta: ♂, October 20. Camp Cilindro: ♀, July 14. Copete (summit): ♀, July 8. Lerida: ♂, 3 ♀, June 14–December 5. Quiel: ♀, June 25. Volcán: ♂, July 28. Gonads active June 14. Altitude 5,200–10,200 feet.

Phloeocastes guatemalensis guatemalensis (Hartlaub). Pale-billed Woodpecker.

Picus guatemalensis Hartlaub, 1844, Rev. Zool., p. 214—Guatemala.

Horqueta: ♂, September 2. Lerida: ♂, June 14. Altitude 5,300 feet.

Davidson (1938, p. 257) established the fact that this woodpecker is at least moderately abundant in Chiriquí, where it was previously known from but two specimens. The Mönniche birds increase to six the number of specimens reported from the Volcán de Chiriquí massif.

Dendrocincla homochroa acedesta Oberholser. Ruddy Wood-creeper.

Dendrocincla acedesta Oberholser, 1904, Proc. Acad. Nat. Sci. Philadelphia, 56: 449—Chiriquí, Panama.

Lerida: ♂, ♀, February 21, November 23. Quiel: ♂, March 3; gonads enlarged. Altitude 5,400 feet.

Costa Rica and Panama specimens of *homochroa* are readily distinguished from more northern examples on the basis both of color and of size. The distinction between *acedesta* and its southern relative rests on supposed color differences so finely drawn as virtually to discredit the separability of the two forms. However, in the absence of a wholly satisfactory representation of *ruficeps* it seems best to accept both forms for the present. It is likely that recognition of *homochroa* and *ruficeps* alone will eventually prove to be a more realistic treatment of this species.

Sittasomus griseicapillus levis Bangs. Olivaceous Woodcreeper.

Sittasomus levis Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 46—Boquete, Panama.

Horqueta: ♂, September 2. Quiel: ♀, November 29. Gonads slightly enlarged September 2. Altitude 5,300 feet.

The Chiriquí specimens at hand are consistently smaller than those referable to *sylvioides* but no color variation of significance is evident in the extensive series of both now before me. At best, *levis* is a weak race, and not certainly separable.

Glyphorhynchus spirurus sublestus Peters. Wedge-billed Woodcreeper.

Glyphorhynchus spirurus sublestus Peters, 1929, Bull. Mus. Comp. Zool., 69: 443—Changuinola, Caribbean slope of northwestern Panama.

Cedral: ♂, July 15, 1933. Gonads slightly enlarged. Altitude 4,800 feet.

Xiphorhynchus erythropygius punctigula (Ridgway). Spotted Woodcreeper.

Dendrorhynchus punctigula Ridgway, 1899, Proc. U. S. Nat. Mus., 11: 544—Naranjo, Costa Rica.

Camp Holcomb: ♂, June 26, 1933. Gonads enlarged. Altitude 5,000 feet.

An exceptionally distinct race with notably constant characters. In a series of seventeen specimens from Costa Rica and western Panama a single skin (Candelaria, Costa Rica) has the thickly spotted pileum and boldly streaked back associated with *parvus* and *erythropygius*. Unfortunately, its plumage is badly "foxed" and the color tone inconclusive.

In his table of wing measurements, Griscom (1937, p. 197) shows that *erythropygius* (Mexico north of the Isthmus of Tehuantepec) apparently is consistently larger than either *parvus* or *punctigula*. While I accept this statement, the following measurements invalidate his further observations that Honduras birds are larger than those from Guatemala, and that *punctigula* is intermediate in size to *parvus* and *erythropygius*.

WING LENGTHS

erythropygius: 3 adults, 122–125 mm. (after Griscom).

parvus: 19 adults, 104–119 mm. (110.6).

Chiapas: 11 adults, 104–119 mm. (113.5).

Guatemala: 4 adults, 104–115 mm. (109).

Honduras: 3 adults, 108–110 mm. (108.7).

Nicaragua: 1 adult, 113 mm.

punctigula: 17 adults, 103–119 mm. (109.5).

Costa Rica: 11 adults, 103–119 mm. (110).

Chiriquí: 6 adults, 103–112 mm. (109).

Lepidocolaptes affinis neglectus (Ridgway). Spot-crowned Woodcreeper.

Picolaptes affinis neglectus Ridgway, 1909, Proc. Biol. Soc. Wash., 22: 73—Coliblanco, Costa Rica.

Alto de Chiquero: ♂, March 24. Bajo Mono: 2 ♂, ♀, March 23, November 3. Casita Alta: ♂, June 18. Cordilleras: ♂, May 13. Lerida: 5 ♂, 4 ♀, sex? February 20–December 15. Quiel: 2 ♂, February 24, June 26. Velo: ♂, ♀, September 5, October 2. Gonads enlarged February 20–September 16. Altitude 5,100–8,000 feet.

Cranioleuca erythroptus rufigenys (Lawrence). Red-faced Spine-tail.

Synallaxis rufigenys Lawrence, 1868, Ann. Lyc. Nat. Hist. N. Y., 9: 105—Costa Rica.

Bajo Mono: ♂, ♀, August 5, October 10. Cordilleras: ♀, May 17. Horqueta: ♂, ♀, April 5, July 29. Lerida: ♂, ♀, June 2, 27. Río Caldera: ♀, May 2. Velo: ♂, sex? October 20, December 6. Gonads active April 5–July 29. Altitude 5,200–6,500 feet.

The rufous pileum and cheeks and other plumage characteristics of full maturity are not acquired before the second year. A Costa Rica male taken January 3 has only a scattering of rufous feathers on the crown. The sides of its head and its under parts are evenly colored, but of a shade intermediate to first year birds and adults. A brown-capped female collected near Boquete on July 29 had enlarged ovaries, indicating that this form breeds while in subadult plumage.

Margarornis rubiginosus rubiginosus Lawrence. Ruddy Tree-runner.

Margarornis rubiginosus Lawrence, 1865, Ann. Lyc. Nat. Hist. N. Y., 8: 128—San José, Costa Rica.

Bajo Mono: 3 ♂, ♀, March 25, August 5. Casita Alta: 2 ♂, ♀, June 1. Cordilleras: ♀, November 18. Gonads enlarged March 26–May 2. Altitude 5,200–6,600 feet.

Pseudocolaptes lawrencii lawrencii Ridgway. Buffy Tufted-cheek.

Pseudocolaptes lawrencii Ridgway, 1878, Proc. U. S. Nat. Mus., 1: 253, 254—La Palma and Navarro.

Camp Cilindro: ♂, July 14. Copete: 2 ♀, July 8. Gonads active. Altitude 5,200–10,000 feet.

The Camp Cilindro specimen is the first of record for Bocas del Toro and the Caribbean slope. Although largely confined to the higher altitudes, *lawrencii* has been found at least 2,000 feet below the minimum altitude of 6,000 feet designated by Peters.

Syndactyla subalaris lineata (Lawrence). Lineated Foliage-Gleaner.

Anabazenops lineatus Lawrence, 1865, Ann. Lyc. Nat. Hist. N. Y., 8: 127—Angostura, Costa Rica.

Bajo Mono: ♂, October 10. Lerida: ♂, ♀, March 17, August 20. Peña Blanca: ♀, October 18. Velo: ♂, ♀, October 20. Gonads enlarged March 17; slightly enlarged August 20. Altitude 5,200–6,000 feet.

Anabacerthia striaticollis variegaticeps (Sclater). Scaly-throated Foliage-Gleaner.

Anabazenops variegaticeps Sclater, 1856 (1857), Proc. Zool. Soc. London, pt. 24, 1856: 289—Córdoba, Veracruz, Mexico.

Alto de Chiquero: ♂, February 27. Camiseta: ♂, July 3. Lerida: 5 ♂, 2 ♀, June 2–October 17. Quiel: ♂, ♀, November 13. Velo: 3 ♂, 2 ♀, June 30–October 15. Gonads slightly enlarged July 15, 31, and November 13. Altitude 5,300–6,100 feet.

Philydor rufus panerythrus Sclater. Buff-fronted Foliage-Gleaner.

Philydor panerythrus Sclater, 1862, Proc. Zool. Soc. London, 1862: 110—Bogotá.

Alto de Chiquero: ♂, March 13. Lerida: ♀, October 17. Velo: ♂, October 2. Gonads enlarged March 13. Altitude 5,400–5,500 feet.

Peters (1945, p. 131, footnote) and de Schauensee (1950, p. 683) have suggested that Costa Rica and Panama birds possibly comprise a distinct race for which the name *Automolus rufescense* Lawrence, 1867, is available. This calls for corroboration, and in the absence

of critical material I prefer to associate these birds with the previously described Colombian form.

Thripadectes rufobrunneus (Lawrence). Streak-breasted Treehunter.

Philydor rufobrunneus Lawrence, 1865, Ann. Lyc. Nat. Hist. N. Y., 8: 127—San José, Costa Rica.

Alto de Chiquero: ♂, April 23. Bajo Mono: ♂, March 23. Cordilleras: ♂, May 13. Lerida: 2 ♂, ♀, August 3–October 22. Quiel: ♂, March 3. Velo: ♀, February 23. Gonads enlarged March 3–May 13; slightly enlarged August 3, September 19, February 25. Altitude 5,300–6,700 feet.

Xenops rutilans septentrionalis Zimmer. Streaked Xenops.

Xenops rutilans septentrionalis Zimmer, 1929, Proc. Biol. Soc. Wash., 42: 82—Guayabo, Costa Rica.

Horqueta: ♂, ♀, September 2, 1933. Altitude 5,300 feet.

A rare bird in Panama where known from perhaps half a dozen specimens taken on the Pacific slope of Volcán de Chiriquí (Boquete, Quiel, Barriles).

Dysithamnus mentalis septentrionalis Ridgway. Plain Antvireo.

Dysithamnus mentalis septentrionalis Ridgway, 1908, Proc. Biol. Soc. Wash., 21: 193—Choctum, Vera Paz, Guatemala.

Horqueta: ♂, June 18, 1933. Gonads enlarged. Altitude 5,300 feet.

Myrmotherula schisticolor schisticolor (Lawrence). Slaty Antwren.

Formicivora schisticolor Lawrence, 1865, Ann. Lyc. Nat. Hist. N. Y., 8: 172—Turrialba, Costa Rica.

Chiquero: ♂, May 18. Lerida: 3 ♂, April 30–August 12. Gonads enlarged April 30–May 18. Altitude 5,100–5,600 feet.

As with *Cranioleuca erythroptus rufigenis*, this form apparently breeds before acquiring fully adult plumage. A male taken May 18 had enlarged gonads, although still in immature plumage except for a black-mottled throat patch. A Nicaragua specimen in similar plumage bears the date March 15 and presumably was hatched the previous spring.

Myrmeciza immaculata zeledoni Ridgway. Immaculate Ant-bird.

Myrmeciza zeledoni Ridgway, 1909, Proc. Biol. Soc. Wash., 22: 74—Guayabo, Costa Rica.

Camp Holcomb: ♀, June 26, 1933. Gonads slightly enlarged. Altitude 5,000 feet.

Previously unknown in Bocas del Toro, although restricted to the Caribbean slope (1,000–4,300 feet) in Costa Rica. Griscom (1935, p. 335) considers *zeledoni* a bird of "arid scrub and gallery forest," but Carriker states that in Costa Rica, where it is very rare, it frequents dense humid jungle.

Formicarius nigricapillus nigricapillus Ridgway. Black-headed Antthrush.

Formicarius nigricapillus Ridgway, 1893, Proc. U. S. Nat. Mus., 16: 670 (in key), 675—Buena Vista, Costa Rica.

Cedral: ♂, July 14, 1933. Altitude 4,800 feet.

An exceedingly rare bird, heretofore known in Panama only from Chiriquí Lagoon and at an altitude of 1,500 feet on Boquete (=Holcomb) Trail. Veraguas specimens mentioned by earlier writers undoubtedly reflect erroneous identifications since it is now conceded that *nigricapillus* apparently does not range beyond the Caribbean slope in Central America.

Gymnopithys leucaspis olivascens (Ridgway). Bicolored Ant-bird.

Pithys bicolor olivascens Ridgway, 1891, Proc. U. S. Nat. Mus., 14: 469—Santa Ana, Honduras.

Cedral: ♂, July 14, 1933. Gonads enlarged. Altitude 4,800 feet.

A distinctly slate-gray area on each side of the occiput suggests some degree of intergradation with *bicolor* of eastern Panama and Colombia. Peters ultimately (1951, p. 247) assigned to *olivascens* all Bocas del Toro examples of *leucaspis* but it is noteworthy that in an earlier paper (1931, p. 321) he was strongly of the opinion that a specimen of similar intermediate appearance taken on Boquete (=Holcomb) Trail at an altitude of 3,500 feet was referable to *bicolor*. The pattern of distribution in Panama is not yet clear but it seems likely that Bocas del Toro is occupied largely if not solely by *leucaspis* of intermediate character.

Grallaria guatimalensis princeps Sclater and Salvin. Scaled Antpitta.

Grallaria princeps Sclater and Salvin, 1869, Proc. Zool. Soc. London, 1869: 418—Calovévora, Veragua, Panama.

Lerida: ♂, September 22. Velo: 2 ♂, September 25. Gonads slightly enlarged September 22. Altitude 5,400–5,700 feet.

The five Chiriquí adults now before me agree very closely with certain specimens from Chiapas and northern Central America. In view of the pronounced individual variation of this species I am hesitant to recognize *princeps* but concede that Chiriquí birds possibly average slightly darker above and may tend to have heavier black scallops than the nominate form.

Scytalopus argentifrons argentifrons Ridgway. Silvery-fronted Tapaculo.

Scytalopus argentifrons Ridgway, 1891, Proc. U. S. Nat. Mus., 14: 475—Volcán de Irazú, Costa Rica.

Alto de Chiquero: ♂, May 13. Bajo Mono: 2 ♂, July 23, August 8. Cordillera: ♀, November 17. Lerida: ♂, February 25. Peña Blanca: ♀, May 19. Velo: ♂, ♀, June 24, August 5. Gonads enlarged February 25–August 5. Altitude 5,400–6,500 feet.

Critical examination of all Central American specimens of *Scytalopus* in our larger museums convinces me that the birds of western Panama and Costa Rica comprise a single species with two clearly defined races, in contradiction to Peters' concept of two distinct species supposedly co-existing in the vicinity of Volcán de Chiriquí. All adults that I have seen from this area agree very closely with Costa Rica specimens and are undeniably separable from Veraguas and eastern Chiriquí birds.

As first remarked by Chapman (1915, p. 421) and now verified, specimens from Boquete and Volcán de Chiriquí tend to have larger bills and less silvery (darker) foreheads than Costa Rica birds. This slight deviation toward *chiriquensis*, obviously a clinal manifestation in the northern population, is not sufficiently pronounced to justify formal recognition.

Eisenmann (*in litt.*) informs me that shortly after publication of the seventh volume of his *Check-list* Peters expressed the opinion that *argentifrons* and *chiriquensis* would prove to be merely representative forms of a single species. Peters' unfortunate error apparently stems from his reliance upon Zimmer's listing (1939, p. 17) as *chiriquensis*

four Boquete specimens in the American Museum. Unknown to Peters, these are immature birds which Zimmer assigned to that form tentatively, but "subject to revision."

Attila spadiceus citreopygus (Bonaparte). Bright-rumped Attila.

Dasycephala citreopyga Bonaparte, 1854, Compt. Rend. Acad. Sci. Paris, 38: 657—Nicaragua.

Lerida: ♂, October 14. Altitude 5,300 feet.

Pachyrhamphus versicolor costaricensis Bangs. Barred Becard.

Pachyrhamphus versicolor costaricensis Bangs, 1908, Proc. New Engl. Zool. Cl., 4: 26—Irazú, Costa Rica.

Velo: ♂, August 4, 1937. Immature. Altitude 5,500 feet.

Exceedingly rare, if museum specimens are a clue to abundance. Heretofore known in Panama from a single specimen collected at Boquete by Batty.

Pachyrhamphus albogriseus ornatus Cherrie. Black-and-White Becard.

Pachyrhamphus ornatus Cherrie, 1891, Proc. U. S. Nat. Mus., 14: 338—Barranca, Costa Rica.

Velo: 2 ♀, May 25 and December 12, 1939. Gonads enlarged May 25. Altitude 5,500 feet.

This becard is decidedly rare throughout its range. There is but one previous record for Chiriquí (Boquete).

Tityra semifasciata costaricensis Ridgway. Masked Tityra.

Tityra semifasciata costaricensis Ridgway, 1906, Proc. Biol. Soc. Wash., 19: 119—Bonilla, Costa Rica.

Lerida: ♂, June 13. Quiel: ♂, ♀, March 21. Gonads enlarged March 21. Altitude 5,200–5,300 feet.

Cephalopterus ornatus glabricollis Gould. Bare-necked Umbrellabird.

Cephalopterus glabricollis Gould, 1850 (1851), Proc. Zool. Soc. London, 18: 92, pl. 20—Cordillera of Chiriquí.

Cedral: ♂, ♀, July 14, 1933. Altitude 4,800 feet.

Heretofore unknown on the Caribbean slope (Bocas del Toro) and rare to uncommon elsewhere in Panama. Although reported as much

as 8,000 feet above sea level in Chiriquí (to 10,000 feet in Costa Rica), this cotinga generally frequents heavy forest at much lower altitudes. It is a matter of interest that the type of *glabricollis*, collected in 1849 by M. Warcewicz, a Polish botanist, is the first bird specimen of record from western Panama.

Procnias tricarunculata (J. and E. Verreaux). Three-wattled Bellbird.

Casmorhynchus tricarunculatus J. and E. Verreaux, 1853, Rev. Mag. Zool., (2), 5: 193—"Bocas del Toro"—north side of Isthmus of Panama.

Chiquero: ♂, February 27. Horqueta: ♀, May 10. Lerida: ♀, August 21. Río Caldera: ♂, March 13. Velo: ♂, ♀, March 8, August 22. Gonads enlarged. Altitude 5,300–6,000 feet.

Mönniche's failure to collect any bellbirds during the peak of the winter season tends to substantiate Carriker's observation (1910, p. 326) that, in common with certain other fruit-eaters, this cotinga engages in a seasonal migration from higher to lower altitudes and is absent from its breeding grounds from early December until February.

Chiroxiphia lanceolata (Wagler). Lance-tailed Manakin.

Pipra lanceolata Wagler, 1830, Isis, p. 931—"Guiana sive Cajenna."

Horqueta: 2 ♂, May 7, 9. Gonads enlarged. Altitude 5,400 feet.

Not previously reported above an altitude of 4,000 feet in the vicinity of Volcán de Chiriquí, but abundant at lower elevations.

Corapipo altera heteroleuca Hellmayr. White-ruffed Manakin.

Corapipo leucorrhoea heteroleuca Hellmayr, 1910, Bull. Brit. Orn. Cl., 25: 87—Boquete, Chiriquí.

Alto de Chiquero and Quiel: 2 ♂, November 10. Altitude 5,300 feet.

This species resembles *leucorrhoea* of northern South America superficially, and the two are considered conspecific by some authors. In my opinion the striking differences in their wing formulae are sufficiently fundamental to justify their separation.

A conspicuous indentation of the posterior border of the white throat patch usually distinguishes male *heteroleuca* from *altera*, which has a slightly rounded (usually) or straight border. The constancy of this character has drawn comment, but it is interesting that one of the Mönniche birds, unlike five other Chiriquí males now before

me, is indistinguishable from a typical example of *altera* from Costa Rica (Peralta, Cartago) in Chicago Natural History Museum.

Sayornis nigricans amnicola Bangs. Black Phoebe.

Sayornis amnicola Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 37—Boquete, Panama.

Horqueta: ♂, July 29. Río Caldera: ♂, November 18. Gonads enlarged July 29. Altitude 5,200–5,500 feet.

The characters of this race are remarkably stable and generally there is no difficulty in separating it from either *aquatica* or *latirostris*. Tropical forms of *nigricans* are presumed to be non-migratory, but it is noteworthy that two March specimens from Ocosingo, Chiapas, the northernmost limits of *aquatica* (Blake, 1949, p. 2), agree in minute detail with typical examples of *amnicola*.

Tyrannus melancholicus chloronotus Berlepsch. Tropical Kingbird.

Tyrannus chloronotus Berlepsch, 1907, Ornith., 14: 474—Temax, Yucatan.

Lerida: 2 ♂, 3 ♀, May 9–November 21. Quiel: ♀, June 30. Velo: ♀, May 2. Gonads enlarged May 2–June 30. Altitude 5,100–5,300 feet.

Legatus leucophaeus leucophaeus (Vieillot). Piratic Flycatcher.

Platyrhynchus leucophaeus Vieillot, 1818, Nouv. Dict. Hist. Nat., nouv. éd., 27: 11—"l'Amérique méridionale" = Cayenne.

Horqueta: 2 ♂, May 7, 9. Gonads enlarged. Altitude 5,300 and 5,400 feet.

Myiodynastes maculatus difficilis Zimmer. Streaked Flycatcher.

Myiodynastes maculatus difficilis Zimmer, 1937, Amer. Mus. Nov., no. 963, p. 9—Bebedero, Costa Rica.

Horqueta: ♀, July 29. Lerida: 5 ♂, 2 ♀, sex? May 10–October 12. Quiel: ♂, ♀, March 21. Gonads enlarged March 21–June 18. Altitude 5,200–5,400 feet.

The characters of this race are so finely drawn as to approach the nebulous. In a series of forty specimens representing virtually all parts of its range I find every manner of variation, including duplication of the very characters attributed to *nobilis* and *tobagensis*. Although clearly a weak race, *difficilis* possibly can be distinguished from its relatives by virtue of average differences not apparent in the

material now before me. For the present, therefore, it seems best to follow Zimmer's masterful revision (1937, pp. 6-17) of the species.

Myiodynastes hemichrysus (Cabanis). Golden-bellied Flycatcher.

Hypermitres hemichrysus Cabanis, 1861, Jour. Orn., 9: 247—Costa Rica.

Camp Cylindro: ♂, July 16. Lerida: 2 ♂, ♀, November 26. Quiel: ♂, September 27. Gonads enlarged November 26. Altitude 5,200-5,600 feet.

Hellmayr, disagreeing with most authors, considered *hemichrysus* a geographical representative of *chrysocephalus*. Their similarity indicates a fairly close relationship, but this is largely offset by their striking differences. These appear to be constant and have led to my present treatment, in the absence of any evidence of intergradation.

This flycatcher apparently is more abundant than has been generally realized. Carriker, writing in 1910, considered it one of the rarest flycatchers in Costa Rica and knew of but three specimens taken in the country. Nevertheless, several years earlier six examples were collected at Coliblanco by J. F. Ferry for Chicago Natural History Museum and a survey of other institutions might be expected to yield similar results. In his Panama list Griscom called *hemichrysus* "very rare," the few known specimens dating chiefly from early explorations. The Mönniche series (1933-38) is the most recent known to me and represents additional localities that somewhat extend the vertical range as previously known.

Megarhynchus pitangua mexicanus (Lafresnaye). Boat-billed Flycatcher.

Scaphorhynchus mexicanus Lafresnaye, 1851, Rev. Mag. Zool., (2), 3: 473—Mexico.

Horqueta: ♀, July 26. Lerida: ♂, ♀, December 5, 13. Quiel: 2 ♀, November 5, 8. Velo: ♀, September 5. Gonads slightly enlarged September 5 and December 13. Altitude 5,000-5,500 feet.

Myiozetetes similis columbianus Cabanis and Heine. Social Flycatcher.

Myiozetetes columbianus Cabanis and Heine, 1859, Mus. Hein., 2: 62—Puerto Cabello, Venezuela, and Carthagena, Colombia.

Lerida: ♂, 2 ♀, February 25, May 3. Gonads slightly enlarged. Altitude 5,300 feet.

This flycatcher is characteristic of essentially open country in the dry lowlands but has also been reported in a heavily forested region (Azuero Peninsula) devoid of extensive clearings. I find no previous record of its occurrence on the slopes of the Volcán de Chiriquí massif.

Myiarchus tuberculifer nigricapillus Cabanis. Dusky-capped Flycatcher.

Myiarchus nigricapillus Cabanis, 1861, Jour. Orn., 9: 250, in text—"Costa Rica"—Bonilla, Costa Rica.

Alto de Chiquero: 2 ♂, ♀, May 1, July 23. Horqueta: ♀, July 28. Lerida: 2 ♂, October 12, 23. Quiel: ♂, November 23. Velo: ♀, November 25. Gonads enlarged May 1. Altitude 5,200–6,000 feet.

In this series the color of the pileum varies from sooty black to deep black, the range of variation in birds from a single small area thus encompassing the characters attributed to *nigricapillus* and *bangsi*, respectively. Similarly, twenty-five Costa Rica specimens from regions occupied by each of these forms are so variable as to the color of the pileum that it is impossible to distinguish the birds of one area from those of another. The integrity of *bangsi* has been widely accepted, but I now see no alternative to merging it with *nigricapillus*.

Nuttallornis borealis (Swainson). Olive-sided Flycatcher.

Tyrannus borealis Swainson in Richardson, 1832, Faun. Bor.-Amer., 2: 141, pl. 35—Cumberland House, Banks of the Saskatchewan, etc.

Alto de Chiquero: ♂, May 9. Horqueta: ♂, September 2. Gonads enlarged May 9. Altitude 5,300 and 6,200 feet.

In his list of Panama birds Griscom recognized two races of *borealis*, both migratory in Central America. If it is conceded that this species is polytypic, measurements of the Mönniche specimens (wing 109, 111 mm.; tail 74, 74 mm.) are referable to *cooperi*, the larger western form.

Olive-sided flycatchers are known in Middle America chiefly as migrants but have occasionally been taken in Costa Rica in winter (January 8, 31). Typical migration dates for the several countries are as follows: Mexico (southern), August 3–19. Guatemala, May 15; August 26–October 19. El Salvador, April 24–May 2; August 28. Costa Rica, April 11–May 31; August 22–November 2.

Contopus virens (Linnaeus). Eastern Wood-Pewee.

Muscicapa virens Linnaeus, 1766, Syst. Nat., 12th ed., 1: 327—Carolina.

Casita Alta: ♂, October 9. Horqueta: ♂, May 16. Lerida: ♀, May 16. Gonads enlarged May 16. Altitude 5,300 and 7,000 feet.

Contopus sordidulus veliei Coues. Western Wood-Pewee.

Contopus veliei Coues, 1866, Proc. Acad. Nat. Sci. Philadelphia, p. 61—"mountains of the Colorado Territory."

Chiquero: ♂, ♀, April 23. Lerida: ♂, May 14. Peña Blanca: October 2. Quiel: ♀, September 17. Altitude 5,200–6,000 feet.

Phillips and Parkes (1955, pp. 245, 246) are here followed in rejecting the use of *richardsonii* for the western wood-pewee.

It is extremely difficult if not impossible to allocate with certainty many individuals of this species collected in regions where two or more races occur together during migration. In treating *veliei* and *sordidulus* I have therefore arbitrarily assigned to the former all males with wing measurements exceeding 84 mm. and all females with wings greater than 81 mm.

The periods during which this flycatcher is to be expected in Central America extend at least from March 27 (Boquete) to May 15, and from August 26 to November 21.

Contopus sordidulus sordidulus Sclater. Mexican Wood-Pewee.

Contopus sordidulus Sclater, 1859, Proc. Zool. Soc. London, 27: 43—southern Mexico and Guatemala.

Bajo Mono: ♂, ♀, November 17. Lerida: ♂, ♀, sex? October 6–12. Quiel: ♂, September 17. Gonads slightly enlarged November 17. Altitude 5,300–5,500 feet.

All examples of *sordidulus* with wings measuring less than 85 mm. (♂) and 82 mm. (♀) are here arbitrarily referred to the small resident race.

Contopus fumigatus lugubris Lawrence. Greater Pewee.

Contopus lugubris Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 8: 134—Barranca, Costa Rica.

Alto de Chiquero: ♀, May 13. Bajo Mono: ♀, July 23. Horqueta: ♂, ♀, July 28, 29. Lerida: ♀, December 15. Quiel: ♂, ♀, October 18, November 5. Gonads enlarged May 13–July 23. Altitude 5,200–6,200 feet.

Empidonax flavescens flavescens Lawrence. Yellowish Flycatcher.

Empidonax flavescens Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 8: 133—Barranca, Costa Rica.

Bajo Mono: 5 ♂, 2 ♀, March 23–November 25. Callejon de Palmas: ♀, October 23. Chiquero: ♀, April 23. Lerida: 2 ♂, 2 ♀, March 5–November 23. Quiel: ♀, September 27. Velo: 3 ♂, 2 ♀, sex? April 13–June 30. Gonads enlarged March 23–June 21; slightly enlarged July 23. Altitude 5,200–6,700 feet.

Empidonax albigularis australis Miller and Griscom. White-throated Flycatcher.

Empidonax albigularis australis Miller and Griscom, 1925, Amer. Mus. Nov., no. 159, p. 5—San Rafael del Norte, Nicaragua.

Lerida: 2 ♂, June 23, 27. Velo: ♂, ♀, June 15. Gonads enlarged. Altitude 5,300–5,400 feet.

A very rare flycatcher, heretofore known in Panama from a single specimen collected at Chiriquicito. An old record for the Canal Zone (Lion Hill) is almost certainly erroneous.

Empidonax atriceps Salvin. Black-capped Flycatcher.

Empidonax atriceps Salvin, 1870, Proc. Zool. Soc. London, 1870: 198—Volcán de Chiriquí, Panama.

Casita Alta: ♀, October 9. Fila Lerida: ♂, sex? July 22, 24. Mirador: ♀, July 17. Volcán: ♂, 4 ♀, 2 sex? July 28–August 12. Altitude 7,000–10,300 feet.

The Mirador specimen, one of two taken below 9,500 feet, is the first of record from the Caribbean slope of Panama. Previously, *atriceps* has been reported in Panama only on the upper slopes of Volcán de Chiriquí (10,800–11,000 feet) and on Cerro Punto at the remarkably low altitude of 6,000 feet (Davidson, 1938, p. 260).

Mitrephanes phaeocercus aurantiiventris (Lawrence). Tufted Flycatcher.

Mitrephorus aurantiiventris Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 8: 173—Tabacales, Costa Rica.

Alto de Chiquero: 2 ♂, sex? May 13, October 16, 18. Bajo Mono: 2 ♂, 2 ♀, March 16, October 10, November 3. Cordillera: ♀, June 13. Quiel: sex? October 18. Velo: 2 ♂, 3 ♀, February 19–October 2. Gonads enlarged February 19–May 13. Altitude 5,200–6,500 feet.

A female taken June 13, 1932, at an altitude of 6,500 feet on the Caribbean slope, is the first of record from the Province of Bocas del Toro. The Veraguas race, *vividus*, apparently is restricted to the Pacific slope.

Platyrinchus mystaceus neglectus (Todd). White-throated Spadebill.

Platytriccus albogularis neglectus Todd, 1919, Proc. Biol. Soc. Wash., 32: 114—
La Colorada, Boyaca, Colombia.

Cordillera: ♂, ♀, November 18. Lerida: 3 ♀, April 30–November 21. Quiel: ♀, November 25. Río Caldera: ♀, May 2. Velo: ♂, May 19. Gonads enlarged May 2–July 31. Altitude 5,300–6,600 feet.

Tolmomyias sulphurescens flavo-olivaceus (Lawrence). Yellow-olive Flycatcher.

Rhynchocyclus flavo-olivaceus Lawrence, 1863, Ann. Lyc. Nat. Hist. N. Y., 8: 8—Lion Hill Station, Panama.

Horqueta: ♂, May 9. Lerida: ♂, October 23. Gonads enlarged May 9. Altitude 5,300 and 5,400 feet.

Restricted to the Pacific slope of Panama but only once previously reported from Volcán de Chiriquí (Davidson, 1938, p. 258). The wing formula (outermost or tenth primary averaging shorter than the fourth) best distinguishes *sulphurescens* from its very similar relative, *flavotectus*. The latter, essentially a lowland bird, has not been found on Volcán de Chiriquí.

Rhynchocyclus brevirostris brevirostris (Cabanis). Eye-ringed Flatbill.

Cyclorhynchus brevirostris Cabanis, 1847, Arch. Naturg., 13, (1), p. 249—
Jalapa, Mexico.

Lerida: ♂, ♀, August 12, October 23. Velo: ♀, July 2. Altitude 5,300–5,500 feet.

Todirostrum cinereum finitimum Bangs. Common Tody-Flycatcher.

Todirostrum cinereum finitimum Bangs, 1904, Proc. Biol. Soc. Wash., 17: 114—
San Juan Batista, Tabasco, Mexico.

Horqueta: ♂, 2 ♀, June 18–July 29. Gonads enlarged June 18. Altitude 5,200–5,300 feet.

Serpophaga cinerea grisea Lawrence. Torrent Tyrannulet.

Serpophaga grisea Lawrence, 1871, Ann. Lyc. Nat. Hist. N. Y., 10: 139—
near San José, Costa Rica.

Camp Cilindro: ♂, July 16, 1933. Chiquero: ♂, ♀, April 23, May 13. Bajo Mono: ♂, July 23. Gonads enlarged. Altitude 5,200–6,500 feet.

The Camp Cylindro specimen is the first of record from Bocas del Toro and the Caribbean slope.

Elaenia flavogaster subpagana Sclater and Salvin. Yellow-bellied Elaenia.

Elaenia subpagana Sclater and Salvin, 1860, Ibis, 2: 36—Dueñas, Guatemala.

Horqueta: ♂, ♀, May 10, 16. Lerida: ♀, March 19. Gonads enlarged. Altitude 5,300 feet.

Elaenia chiriquensis chiriquensis Lawrence. Lesser Elaenia.

Elaenia chiriquensis Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 8: 176—David, Panama.

Lerida: ♂, 2 ♀, February 26—May 6. Gonads enlarged. Altitude 5,300 feet.

This flycatcher is abundant locally in the arid lowlands and second growth scrub of the Pacific slope but has not been reported before in the vicinity of Volcán de Chiriquí. Its presence there may be a fairly recent development, coincident with man's alteration of the original flora. The only other specimens taken in the Province since Hicks collected the type at David apparently are four males obtained at El Banco and Chame in 1930 and 1932 by Davidson (1938, p. 259).

Elaenia frantzii frantzii Lawrence. Mountain Elaenia.

Elaenia frantzii Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 8: 172—San José, Costa Rica.

Bajo Mono: 2 ♂, October 18. Casita Alta: ♂, ♀, June 21, November 1. Chiquero: ♀, April 2. Fila Lerida: ♀, July 24. Lerida: 7 ♂, 10 ♀, February 20—September 24. Quiel: 3 ♂, ♀, March 3—September 27. Velo: ♂, July 22. Gonads enlarged February 20—April 21; slightly enlarged May 7—July 7. Altitude 5,100—9,500 feet.

Ridgway's measurements (1907, p. 435) illustrate the notable size variability of *frantzii*. They need not be detailed here. This variable, and that of color, especially of the under parts, is fully expressed in the Mönniche series. Adults in fresh spring plumage are brownish olive above, becoming dull olive-brown with wear as the season advances. Whitening of the belly and crissum has been considered a juvenile character, but nine adults, representing both spring and fall, are decidedly paler, less greenish below, and have much grayer breasts than seventeen other birds taken during the same period.

Several of the pale birds have virtually immaculate white bellies and in this respect can not be distinguished from two obviously immature specimens.

Tyranniscus vilissimus parvus Lawrence. Paltry Tyrannulet.

Tyranniscus parvus Lawrence, 1862, Ibis, 4: 12—Isthmus of Panama.

Horqueta: ♂, sex? May 16, July 27. Lerida: 2 ♂, September 29, November 25. Velo: ♂, ♀, February 20, 25. Gonads slightly enlarged February 20, 25. Altitude 5,200–6,700 feet.

Achrochordopus zeledoni zeledoni (Lawrence). White-fronted Tyrannulet.

Pogonotriccus (?) *zeledoni* Lawrence, 1869, Ann. Lyc. Nat. Hist. N. Y., 9: 144—Dota and Barranca, Costa Rica.

Lerida: ♂, August 1, 1932. Altitude 5,300 feet.

For the present I follow Hellmayr and most recent writers in associating this little-known genus with the flycatchers, although Ridgway considered it a cotinga and Wetmore (Wetmore and Phelps, 1956, p. 8) has recently expressed his firm agreement.

The rarity of the Central American form is attested by the fact that hitherto but three specimens, all females, have been recorded in Panama (Boquete, January and March, 1901). Carriker, writing in 1910, listed only four Costa Rica specimens, collected in widely separated areas and at altitudes of 1,200 to 4,000 feet above sea level.

At my request Dr. Raymond Paynter kindly compared the Lerida male with the three Boquete females at Cambridge and has remarked (*in litt.*) on several minor differences as follows: "In color, your specimen is less bright green above, the gray of the head is slightly darker, and the light edges of the wings are slightly less bright yellow; below the color is almost identical. The differences are not very pronounced. This in general agrees with Ridgway's description (1907, p. 798) of the differences between the sexes, although he thought sexual dimorphism would be found to be lacking when more material became available. Your male would seem to confirm the fact that there is a difference.

"The bill is the only disturbing feature. Our three females differ slightly from one another in the shape of the bill, but your bird has definitely a narrower bill. Unfortunately, Ridgway did not mention this character in the description of the male. Nevertheless, I feel certain that this is merely a variant."

Measurements in millimeters: 3 females: wing (flat) 60.5–62 (61.3), tail 45–46 (45.7), culmen (base) 11–12 (11.5). Male: wing 65.0, tail 48.0 (culmen definitely narrower than females, but make of skin prohibits comparable measurement).

Mionectes olivaceus olivaceus Lawrence. Olive-striped Flycatcher.

Mionectes olivaceus Lawrence, 1868, Ann. Lyc. Nat. Hist. N. Y., 9: 111—Barranca and Dota, Costa Rica.

Bajo Mono: ♂, October 10. Lerida: ♀, November 21. Altitude 5,200–5,300 feet.

Pygochelidon cyanoleuca cyanoleuca (Vieillot). Blue-and-white Swallow.

Hirundo cyanoleuca Vieillot, 1817, Nouv. Dict. Hist. Nat., nouv. éd., 14: 509—Paraguay.

Alto de Chiquero: ♂, 2 ♀, October 18. Altitude 5,400 feet.

Cyanocorax affinis zeledoni Ridgway. Black-chested Jay.

Cyanocorax affinis zeledoni Ridgway, 1899, Auk, 16: 255—Talamanca, Costa Rica.

Horqueta: ♀, May 10. Velo: ♂, April 6. Gonads enlarged. Altitude 5,200 and 5,300 feet.

These specimens, the first of record from the Volcán de Chiriquí massif, are appreciably richer, more purely yellow below than three birds from the adjacent lowlands (Boqueron). The latter, collected in December, 1901, are indistinguishable from two specimens of both sexes procured at Obaldia, Darien, in March and May, 1931. There is no significant difference in size. On present evidence it seems unlikely that the color variation noted above is correlated with sex, season, or age of the skins. Additional material from Volcán de Chiriquí is urgently needed for comparison both with Costa Rica birds and with a more representative series from the Panama lowlands.

Cyanolyca cucullata cucullata (Ridgway). Azure-hooded Jay.

Cyanocorax cucullatus Ridgway, 1885, Proc. U. S. Nat. Mus., 8: 23—Navárrro, Costa Rica.

Camp Holcomb: 2 ♂, ♀, June 26, July 14. Gonads slightly enlarged June 26. Altitude 5,000 feet.

This jay has been taken as low as 3,000 feet on Boquete Trail (Bocas del Toro), at 7,000 feet on the Caribbean slope of Volcán de

Chiriquí, and near the Continental Divide in extreme eastern Veraguas (Chitrá). I am unable to account for its apparent absence on the Pacific slope of Chiriquí Province.

In his revision of this species, Pitelka (1951a) recognized four races, of which the Chiapas-Guatemala and Honduras populations respectively were described as new. Adults of *guatimalae* are said to differ from *mitrata* of Veracruz and Oaxaca in having a more purplish occipital patch and darker, more purplish lower back, rump and posterior under parts; juveniles are said to have less white bordering the occipital patch. These distinctions are not evident in the series of eleven adult and four immature specimens from Veracruz, Chiapas, and Guatemala now before me. The very slight color variation of the adult occipital patch clearly has no geographic significance. Only two of six adults from Chiapas and Guatemala have somewhat darker, more purplish lower backs, etc. than any of my five Veracruz birds. Evidence of racial differences in juveniles, of which I have examined two each from Veracruz and Chiapas, appears to be inconclusive. While I concede that a more representative sampling of the two populations might reveal a definite trend in the nature of a cline, nomenclatural recognition of the more southern birds seems undesirable in view of the high incidence of exceptions noted above.

I have not seen material from that portion of Central America assigned to the proposed race, *hondurensis*, but the stated characters of this form do not inspire confidence. All of its characters, in the final analysis, are simply reversals of those given for *guatimalae*, coupled with a reiteration of the accepted distinction between *mitrata* and *cucullata* as previously known.

Cyanolyca argentigula argentigula (Lawrence). Silvery-throated Jay.

Cyanocitta argentigula Lawrence, 1875, Ann. Lyc. Nat. Hist. N. Y., 11: 88—
"Talamanca"—near Pico Blanco, Liri Valley, Costa Rica.

Casita Alta: ♀, June 15. Copete: ♂, July 8. Peña Blanca: ♂, November 1. Velo: ♂, ♀, July 17. Gonads enlarged June 15–July 8. Altitude 5,000–10,000 feet.

Pitelka (1951b) has shown that *Cyanolyca blandita* Bangs is a synonym of *C. argentigula* Lawrence by virtue of the fact that Lawrence's type proves also to be a violet-throated bird, indistinguishable from Chiriquí specimens ("*blandita*"), although taken in southeastern Costa Rica. The quite distinct northern, silvery-throated race was renamed *albior* and its range restricted to the central cordillera of

Costa Rica north of the Cordillera de Talamanca, where it is replaced by the Panama form.

All Mönniche localities listed above are east of Chiriquí's peak, but within the Pacific drainage. Heretofore this jay has been known in Panama only from the northern (Caribbean) slope of Volcán de Chiriquí (9,000 feet) where W. W. Brown collected eleven specimens, including the type of "*blandita*," from a small colony, in June, 1901.

Cinclus mexicanus ardesiacus Salvin. American Dipper.

Cinclus ardesiacus Salvin, 1867, Ibis, p. 121, pl. 2—Cordillera de Tolé, Veraguas.

Bajo Mono: 2 ♂, May 19, November 27. Río Caldera: ♀, November 18. Gonads enlarged May 19. Altitude 5,200–5,600 feet.

Thryothorus modestus modestus Cabanis. Plain Wren.

Thryothorus modestus Cabanis, 1860, Jour. Orn., 8: 409—San José, Costa Rica.

Horqueta: 2 ♂, 4 ♀, July 27–September 2. Lerida: 2 ♂, 2 ♀, sex? May 7–October 20. Quiel: 2 ♂, ♀, February 22, June 26. Gonads enlarged February 22–June 24. Altitude 5,200–5,400 feet.

Aldrich (1937, p. 112) has commented on the variation in color in this species due to abrasion of the plumage. Taking this factor into account, I am unable to detect even the slight average color difference between Costa Rica and Panama birds that was acknowledged with obviously little conviction by Hellmayr (1934, p. 170, footnote).

Size proves to be even less significant than color in distinguishing these birds. Bangs considered *elutus* smaller than *modestus*, but Ridgway found a marked overlap in the measurements of the two and only the average length of the tail and middle toe of *elutus* less than in Costa Rica birds. My measurements are essentially in agreement with those of Ridgway. Costa Rica (7 ♂): wing 57–61 mm. (59); tail 47–55 mm. (52). Panama (8 ♂): wing 58–64 mm. (61); tail 49–53 mm. (50).

In my opinion *elutus* is clearly a "millimeter race" of questionable merit and should be abandoned. Although opinions may differ in this and similar cases, one can have little patience with those who profess even to distinguish "intermediates" between populations so slightly (if at all) differentiated.

Thryothorus rutilus hyperythrus Salvin and Godman. Rufous-breasted Wren.

Thryothorus hyperythrus Salvin and Godman, 1880, Biol. Centr.-Amer., Aves, 1: 91—Paraiso Station, Panama Railroad, Panama.

Bajo Mono: ♂, May 19. Velo: ♀, October 20. Gonads enlarged May 19. Altitude 5,200–5,500 feet.

Troglodytes musculus inquietus Baird. Southern House-Wren.

Troglodytes inquietus Baird, 1864, Rev. Amer. Bds., 1: 143—Panama Railroad.

Horqueta: ♂, May 21. Lerida: 3 ♂, 3 ♀, March 20–November 21. Gonads enlarged March 20–June 17. Altitude 5,300–5,400 feet.

Troglodytes ochraceus ligea Bangs. Ochraceous Wren.

Troglodytes solstitialis ligea Bangs, 1908, Proc. New Engl. Zool. Cl., 4: 29—Boquete, Volcán de Chiriquí, Panama.

Bajo Mono: 2 ♂, March 23, June 18. Casita Alta: 2 ♂, ♀, June 15, October 23. Lerida: ♂, August 12. Altitude 5,200–8,200 feet.

A weak race, but averaging slightly duller, less reddish above than *ochraceus*. Birds in worn plumage are indistinguishable. The size of the bill appears to lack significance.

Thryorchilus browni browni (Bangs). Timberline Wren.

Troglodytes browni Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 53—Volcán de Chiriquí, Panama.

Copete (summit): 2 ♀, July 8. Volcán: 2 ♂, 2 ♀, August 12. Altitude 10,300 feet.

Henicorhina leucophrys collina Bangs. Gray-breasted Wood-Wren.

Henicorhina collina Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 55—Boquete, Panama.

Alto de Chiquero: ♂, October 11. Bajo Mono: ♂, 2 sex? July 23, November 3. Casita Alta: 2 ♀, April 10, July 8. Cordillera (Bocas del Toro): ♀, July 13. Cordillera (Boquete): 4 ♂, 2 ♀, July 16–November 18. Fila Lerida: ♀, July 24. Lerida: ♂, 2 ♀, June 27–October 11. Peña Blanca: ♀, October 18. Quiel: ♀, June 26. Velo: ♀, February 24. Gonads slightly enlarged June 26–October 18. Altitude 5,200–9,500 feet.

Microcerculus marginatus philomela (Salvin). Nightingale Wren.

Cyphorhinus philomela Salvin, 1861, Proc. Zool. Soc. London, 1861: 202—Vera Paz, Guatemala.

Volcán: 1 immature, July 29, 1937. Altitude 10,200 feet.

I am unable to associate this specimen with any of the plumage phases so ably worked out and discussed by Griscom (1932, pp. 360-365). Both the bill, by its very pale under side, and the texture of the plumage indicate a stage of development somewhat earlier than that which he considers to represent the "first juvenile or immature plumage." The latter, which has been illustrated (Biol. Centr.-Amer., Aves, 4, pl. 5, fig. 3, 1880) and which is similar to Salvin's type, has a wholly black bill, although the throat and chest are virtually uniform "dirty, dingy, grayish brown." The pale-billed Chiriquí specimen has a distinctly whitish throat, much like that of adults, and contrasting, essentially brown breast and belly.

This specimen apparently represents an early plumage of the bird currently considered the adult of *philomela*, but its relationship to the black-billed bird with uniformly dingy under parts (eight Chiapas specimens examined) is enigmatic. Despite Griscom's exhaustive study of the group, there remains the unlikely possibility that two distinct species of nightingale wren actually do exist in Central America.

This wren inhabits dense, humid forests, chiefly at moderate altitude. Carriker found it as much as 7,000 feet above sea level in Costa Rica, but in Panama its occurrence above 5,000 feet is unusual.

Mimus gilvus melanopterus Lawrence. Tropical Mockingbird.

Mimus melanopterus Lawrence, 1849, Ann. Lyc. Nat. Hist. N. Y., 5, no. 1, p. 35, pl. 2—Venezuela.

Lerida: ♂, August 23, 1937. Gonads slightly enlarged. Altitude 5,300 feet.

This specimen antedates by several months the first reported observation of a mockingbird in the Republic (Panama City, January, 1938). Chapman's summary (1941) of the earliest Panama records of this common South American species shows that it was established locally in the Canal Zone as a breeding bird in the late 1930's, presumably having been introduced from Venezuela or Colombia somewhat earlier by human agency. There is as yet no record of its occurrence on Barro Colorado Island. The Mönniche specimen possibly reflects a western extension of range from the Canal Zone, but in the absence of other records from the western half of the country I am inclined to consider it an escaped cage bird. Wing 120 mm.; exposed culmen 18 mm.; tail broken.

Turdus assimilis cnephosus (Bangs). White-throated Robin.

Merula leucauchen cnephosa Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 92—Boquete, Chiriquí, Panama.

Horqueta: ♂, June 18. Lerida: 2 ♀, April 28, May 14. Quiel: ♂, February 19. Velo: ♀, May 23. Gonads enlarged. Altitude 5,300–5,500 feet.

These specimens are not certainly separable from three examples of *oblitus* in Chicago Natural History Museum. In fact, one of the latter, a February female from Peralta, Cartago, is even browner above and below than any of the Panama specimens. Nevertheless, I follow Hellmayr in recognizing *cnephosus*, pending an opportunity to compare Chiriquí specimens with a more representative series from southwestern Costa Rica.

Turdus grayi casius (Bonaparte). Clay-colored Robin.

Planesticus casius Bonaparte, 1855, Compt. Rend. Acad. Sci. Paris, 41: 657—Panama.

Lerida: 2 ♂, 4 ♀, May 15–October 22. Quiel: ♀, September 27. Gonads enlarged May 15. Altitude 5,300–5,600 feet.

Turdus plebejus plebejus Cabanis. Mountain Robin.

Turdus plebejus Cabanis, 1860 (1861), Jour. Orn., 8: 323—Costa Rica.

Bajo Mono: ♂, ♀, November 25. Horqueta: ♀, May 10. Lerida: 2 ♂, 2 ♀, July 2–December 15. Peña Blanca: ♂, November 5. Quiel: 2 ♂, November 13, 27. Río Caldera: ♂, May 2. Velo: ♂, June 29. Gonads enlarged May 2. Altitude 5,300–7,000 feet.

I disagree with Hellmayr's treatment of this and related highland thrushes of Central America as races of the South American species *ignobilis*. The latter is a lowland bird and, like *plebejus*, has quite distinctive characters. There is no evidence of intergradation between the two.

Turdus nigrescens Cabanis. Sooty Robin.

Turdus nigrescens Cabanis, 1860 (1861), Jour. Orn., 8: 324—Volcán de Irazú, Costa Rica.

Casita Alta: 2 ♂, 2 ♀, October 9–November 10. Peña Blanca: ♂, July 23. Volcán: 2 ♂, ♀, sex? July 27, 28. Altitude 6,500–10,100 feet.

This robin is virtually restricted to the Temperate Zone, at altitudes exceeding 10,000 feet. Boucard (1878, Proc. Zool. Soc. Lon-

don, p. 50) reported it as low as 6,000 feet on Volcán de Irazú, but Carriker nevertheless states that *nigrescens* does not occur below 7,000 feet in Costa Rica. Brown collected twenty-four specimens near the summit of Volcán de Chiriquí, where heretofore the species has not been reported below 10,000 feet.

Myadestes ralloides melanops Salvin. Black-faced Solitaire.

Myiadestes melanops Salvin, 1864 (1865), Proc. Zool. Soc. London, 1864: 580, pl. 36—Tucurrique, Costa Rica.

Alto de Chiquero: ♂, ♀, March 24, April 2. Casita Alta: ♀, July 23. Lerida: 8 ♂, March 10–November 26. Quiel: ♂, March 3. Velo: ♂, ♀, March 30, June 24. Volcán: ♂, July 27. Gonads enlarged March 3–July 2. Altitude 5,300–9,700 feet.

Most writers have treated *melanops*, *coloratus*, and *ralloides* as distinct species. This both ignores the rather obvious affinities of *coloratus* and conceals the true relationship of *melanops* and *ralloides* as evidenced by the intermediate form. The composite appearance of the east Panama bird (*coloratus*), in which the conspicuously distinctive characters of both *ralloides* and *melanops* are strikingly combined, emphasizes the closeness of their relationship and probable conspecificity.

Hylocichla ustulata swainsoni (Tschudi). Olive-backed Thrush.

Turdus swainsoni (Cabanis MS.) Tschudi, 1845, Faun. Peru., Aves, p. 28—Carlton House, Saskatchewan.

Alto de Chiquero: ♂, ♀, May 9, 13. Horqueta: ♂, April 5. Lerida: 2 ♂, 2 ♀, April 5–May 13; October 11. Gonads enlarged April 5–May 13. Altitude 5,100–6,500 feet.

Catharus fuscater hellmayri Berlepsch. Slaty-backed Nightingale-Thrush.

Catharus fuscater hellmayri Berlepsch, 1902, Orn. Monatsber., 10: 69—Chiriquí.

Bajo Mono: 2 ♂, 2 ♀, May 19–August 8. Gonads enlarged May 19–July 23. Altitude 5,500–6,500 feet.

An immature female collected July 23 is deep sooty brown (not slate-black) above, and its pileum and upper tail coverts are somewhat purer (less sooty) brown than the back. Throat, breast, and sides are deep, rich brown, decidedly paler and brighter than the upper parts, and the feathers have light shaft streaks that vaguely suggest mottling. The white of abdomen is restricted and somewhat

dingy. Bill black, legs (dried) brownish orange. Wing 81 mm.; tail 58 mm.; bill 14 mm.

Catharus frantzii frantzii Cabanis. Ruddy-capped Nightingale-Thrush.

Catharus frantzii Cabanis, 1860 (1861), Jour. Orn., 8: 323—Volcán de Irazú, Costa Rica.

Cordilleras: 3 ♂, 3 ♀, May 12–16. Lerida: ♂, 3 ♀, sex? May 12–November 21. Peña Blanca: ♀, October 15. Velo: ♂, ♀, June 23, July 22. Gonads enlarged May 12–June 23. Altitude 5,300–6,500 feet.

Griscom (1937, p. 198) has shown Hellmayr's error in treating *frantzii* as a race of *occidentalis*. These species are best distinguished by the color of the bill and by the presence or absence of a distinct buffy patch at the base of the inner webs of the remiges as viewed from below. Of fifteen clearly adult *frantzii* examined, only two have a suggestion of blackening on the terminal portion of the mandible and none has a wing patch. Both characters are unreliable in separating immature birds.

Catharus aurantiirostris russatus Griscom. Orange-billed Nightingale-Thrush.

Catharus griseiceps russatus Griscom, 1924, Amer. Mus. Nov., 141: 6—Boruca, Costa Rica.

Bajo Mono: ♂, October 10. Horqueta: 4 ♂, ♀, May 7–21. Lerida: 4 ♂, June 30–October 21. Velo: 2 ♂, 2 ♀, May 13–July 22. Gonads enlarged May 7–July 1. Altitude 5,200–5,400 feet.

Evidence favoring the merging of *C. griseiceps* and *C. aurantiirostris* into a single species has been presented by Zimmer (1944, p. 405) and is reflected in my treatment of *russatus*. The dusky-capped and brown-capped populations apparently are linked by the Colombian form, *inornatus*, which has some characters of each and would be difficult to allocate with assurance if two species are recognized. The concept of a single species with both dusky-capped and brown-capped forms, these linked by a third population with modified characters of both, is biologically sound and clarifies an otherwise confusing distributional pattern.

Catharus gracilirostris gracilirostris Salvin. Black-billed Nightingale-Thrush.

Catharus gracilirostris Salvin, 1864 (1865), Proc. Zool. Soc. London, 1864: 580—Volcán de Cartago, Costa Rica.

Casita Alta: ♂, ♀, June 21, July 1. Peña Blanca: 2 ♂, ♀, August 1–November 1. Volcán: ♂, 2 ♀, July 29, August 12. Gonads enlarged June 21–September 16. Altitude 6,700–10,300 feet.

Zeledonia coronata Ridgway. Wren-Thrush.

Zeledonia coronata Ridgway, 1889, Proc. U. S. Nat. Mus., 11: 538—Volcán de Poas.

Copete: ♂, 2 ♀, August 8, 22. Volcán: ♂, ♀, July 28. Gonads slightly enlarged July 28. Altitude 10,000–10,300 feet.

Most numerous at very high altitudes but occasionally found as low as 5,800 feet on Volcán de Chiriquí. Carriker states that in Costa Rica *Zeledonia* occurs wherever there are humid forests above an altitude of 5,000 feet.

Bombycilla cedrorum Vieillot. Cedar Waxwing.

Bombycilla cedrorum Vieillot, 1807 (1808), Hist. Nat. Amer., 1: 88, pl. 57—Amérique depuis le Canada etc.=eastern North America.

Quiel: ♂, 2 ♀, March 21, 1933. Lerida: ♂, sex? March 19, 1933. Altitude 5,200 and 5,300 feet.

Cedar waxwings have been reported in Panama on but five other occasions since Arcé collected a specimen in "Chiriquí" many years ago (Scholes and Scholes, 1954, p. 167). All five observations were made on the Pacific side of the Canal Zone during the winter of 1951 (January 14–March 4).

Ptilogonys caudatus Cabanis. Long-tailed Silky-flycatcher.

Ptilogonys caudatus Cabanis, 1860 (1861), Jour. Orn., 8: 402—Irazú, Costa Rica.

Alto de Chiquero: 2 ♂, March 24. Casita Alta: ♂, June 21. Copete (summit): ♀, July 8. Lerida: ♂, July 28. Peña Blanca: ♂, ♀, October 2. Volcán: 2 ♀, July 30, August 12. Gonads enlarged March 24; slightly enlarged June 21–August 12. Altitude 5,400–10,300 feet.

This common bird of the Temperate Zone has seldom been reported below an altitude of 8,000 feet. Four of the nine Mönniche specimens were taken 6,200–6,400 feet above sea level and a fifth, from Lerida (5,400 feet), probably is without precedent. Lawrence's early record for San José, Costa Rica (3,500 feet), is extremely doubtful.

Phainoptila melanoxantha melanoxantha Salvin. Black-and-yellow Silky-flycatcher.

Phainoptila melanoxantha Salvin, 1877, Proc. Zool. Soc. London, 1877: 367—Costa Rica=San Francisco.

Bajo Mono: ♂, ♀, November 27. Camp Holcomb: ♂, July 14, 1933. Copete: ♀, August 4. Gonads enlarged July 14. Altitude 5,200–9,800 feet.

The Camp Holcomb bird is the first of record from Bocas del Toro and the Caribbean slope. Heretofore the race has been reported in Panama only on Volcán de Chiriquí (4,000–11,000 feet).

Vireo carmioli Baird. Yellow-winged Vireo.

Vireo carmioli Baird, 1866, Rev. Amer. Bds., 1: 356—Dota Mountains, Costa Rica.

Alto de Chiquero: ♂, May 1. Bajo Mono: 2 ♂, May 19, November 3. Casita Alta: immature, July 24. Fila Lerida: ♂, July 24. Lerida: 2 ♀, sex? April 4–October 30. Peña Blanca: 3 ♂, May 19–August 1. Gonads enlarged May 1–19. Altitude 5,300–9,500 feet.

Prior to 1931, when Rex R. Benson collected six specimens on Volcán de Chiriquí, this vireo was known in Panama from but two Chiriquí examples taken many years earlier by Arcé and W. W. Brown. Obviously the species is much less rare in Panama than published records indicate.

Vireo flavifrons Vieillot. Yellow-throated Vireo.

Vireo flavifrons Vieillot, 1807 (1808), Hist. Nat. Ois. Amér., 1: 85, pl. 54—"Etats Unis"—eastern United States.

Lerida: ♂, April 4, 1933. Altitude 5,500 feet.

Vireo olivaceus olivaceus (Linnaeus). Red-eyed Vireo.

Muscicapa olivacea Linnaeus, 1766, Syst. Nat., ed. 12, 1: 327—in America septentrionali=South Carolina.

Lerida: ♂, sex? April 10, September 21. Altitude 5,300 feet.

Vireo olivaceus flavoviridis (Cassin). Yellow-green Vireo.

Vireosylva flavoviridis Cassin, 1851, Proc. Acad. Nat. Sci. Philadelphia, 5: 152—Panama and San Juan de Nicaragua, Nicaragua.

Horqueta: 6 ♂, ♀, May 7–July 27. Lerida: 4 ♂, May 7–June 18. Quiel: ♂, April 25. Gonads enlarged April 25–June 18. Altitude 5,200–5,400 feet.

This vireo differs markedly from typical *olivaceus* and is considered a distinct species by many. Although there is little or no evidence of direct intergradation between the two, Zimmer (1941b, pp. 2-4) has shown that the characters of *flavoviridis* approach, in varying degrees, the characters of several South American vireos that clearly show close relationship with the "*chivi*" group and *olivaceus*. The concept of a single, highly variable species is further strengthened by the fact that none of the forms generally associated with the *olivaceus*, *chivi*, and *flavoviridis* groups, respectively, occur together during the breeding season.

In his list of Panama birds Griscom granted *flavoviridis* specific rank and designated *insulanus* as the breeding form. I am unable to distinguish Chiriquí birds from specimens of the same season collected in Mexico and northern Central America. I concur with Zimmer and Wetmore in the opinion that *insulanus* is not defensible.

Vireo philadelphicus (Cassin). Philadelphia Vireo.

Vireosylvia philadelphica Cassin, 1851, Proc. Acad. Nat. Sci. Philadelphia, 5: 153—Philadelphia, Pennsylvania.

Lerida: ♂, ♀, February 23, November 25. Altitude 5,300 and 5,400 feet.

Vireo gilvus chiriquensis (Bangs). Warbling Vireo.

Vireosylvia josephae chiriquensis Bangs, 1903, Proc. New Engl. Zool. Cl., 4: 9—Boquete, Volcán de Chiriquí, Panama.

Alto de Chiquero: ♂, ♀, May 13, 15. Bajo Mono: 2 ♀, October 15. Horqueta: ♂, 2 ♀, May 21–July 29. Lerida: 8 ♂, 6 ♀, March 19–November 26. Quiel: 2 ♂, ♀, sex? June 30–November 27. Velo: 3 ♂, ♀, June 18–July 22. Gonads enlarged March 19–July 3; slightly enlarged September 19. Altitude 5,200–6,200 feet.

I concur with Zimmer (1941b, p. 16) in merging vireos of the "*leucophrys*" group with *gilvus*. Their conspecific relationship was originally suggested in 1872 by Ridgway, who noted the partial intermediacy of Orizaba birds. This population, later described as *amauronotus*, together with *connectens* and *leanorae*, of Guerrero and Hidalgo, respectively, bridges the apparent gap between the two dissimilar sections of the species.

Hylophilus decurtatus decurtatus (Bonaparte). Gray-headed Greenlet.

Sylvicola decurtata Bonaparte, 1837 (1838), Proc. Zool. Soc. London, 5: 118—Guatemala.

Camiseta: sex? July 3. Horqueta: ♂, May 16. Gonads enlarged May 16. Altitude 5,300 and 6,000 feet.

Certain individuals of a very large series from southern Mexico, Guatemala, Costa Rica and western Panama show minor differences but I find no evidence of geographic variation. Investigators who have recognized a southern race, *pusillus*, disagree so widely in their concept of its distribution as to undermine all confidence in the stability of its supposed characters.

Cyclarhis gujanensis subflavescens Cabanis. Rufous-browed Peppershrike.

Cyclorhis subflavescens Cabanis, 1860 (1861), Jour. Orn., 8: 405—highlands of Costa Rica.

Casita Alta: ♀, June 15. Cordilleras: ♀, sex? May 12, 16. Fila Lerida: 2 ♂, ♀, June 18. Gonads enlarged May 12–June 18. Altitude 6,500–8,200 feet.

Chiriquí and Costa Rica birds are indistinguishable, and they are readily separable from *perrygoi* of eastern Veraguas, Herrera, and Cocle. In Panama *subflavescens* apparently is limited to the Pacific slope, where heretofore it has been reported only at altitudes of 2,800–5,300 feet above sea level. An immature bird collected May 16 has the appearance of a recent nestling. Wing 66 mm.; tail 31 mm.; exposed culmen 12 mm.

Diglossa plumbea plumbea Cabanis. Slaty Flower-piercer.

Diglossa plumbea Cabanis, 1860, Jour. Orn., 8: 411—Costa Rica.

Copete (summit): ♂, August 1. Horqueta: ♀, June 18. Lerida: ♂, ♀, sex? June 14–November 25. Peña Blanca: ♂, October 2. Río Caldera: ♂, May 2. Velo: ♂, ♀, June 24, October 30. Volcán: ♂, August 12. Gonads enlarged May 2–August 12. Altitude 5,300–10,500 feet.

Reasons thus far advanced for merging *plumbea* and *sittoides* with *baritula* are not reassuring. By way of buttressing Hellmayr's concept, Zimmer (1942, p. 1) calls attention to the more or less matching gray upper parts of all three, and the fundamental similarity of the under parts of *baritula* and *sittoides*. The distributional pattern, in which the continuity of the ruddy-bellied sections is disrupted by the gray *plumbea* and *veraguensis* populations, is roughly comparable to that of the *lafresnayii-aterrima-carbonaria* complex.

This parallel is interesting but it does not alter the fact that no intergradation occurs between *baritula* and *sittoides*, and there is but

slight evidence that such exists between either of these groups and *plumbea*. It is conceded that the ruddy-bellied groups, and possibly the gray-bellied as well, have a common origin. Nevertheless, the conspicuous differences noted above, when correlated with the interrupted pattern of distribution, seemingly point to long isolation—at least of the *plumbea* section—and attendant evolvement beyond the subspecific level.

Two males, both October birds with enlarged gonads, were taken at altitudes exceeding 10,000 feet, well above the highest previous record of occurrence in Panama (7,000 feet). In Costa Rica Carriker found the species most abundant between 8,000 feet and timber-line.

Cyanerpes cyaneus carneipes (Sclater). Red-legged Honey-creeper.

Coereba carneipes Slater, 1859, Proc. Zool. Soc. London, 27: 376—Playa Vicente, Oaxaca, and Córdoba, Veracruz, Mexico.

Horqueta: ♂, ♀, April 5, May 10. Lerida: 5 ♂, 9 ♀, sex? June 13–October 27. Quiel: ♂, April 25. Gonads enlarged April 5–June 14. Altitude 5,300 feet.

Cyanerpes lucidus isthmicus Bangs. Shining Honeycreeper.

Cyanerpes lucidus isthmicus Bangs, 1917, Auk, 24: 306—Paso Real, Costa Rica.

Lerida: 3 ♂, 6 ♀, September 21–October 20. Velo: ♀, October 20. Altitude 5,200 and 5,300 feet.

I would be inclined to follow Hellmayr in merging this species with *caeruleus* of South America but for De Schauensee's reference (1951, pp. 950, 951) to the occurrence of both *isthmicus* and *chocoensis* in extreme northwestern Colombia (Río Jurado). The respective species are much alike superficially, but both sexes of each have quite distinctive characters. There is no evidence of intergradation.

Dacnis venusta venusta Lawrence. Scarlet-thighed Dacnis.

Dacnis venusta Lawrence, 1862, Ann. Lyc. Nat. Hist. N. Y., 7: 464—Panama Railroad.

Alto de Chiquero: 2 ♂, March 24, April 23. Horqueta: 3 ♂, May 9–September 2. Lerida: 6 ♂, 4 ♀, April 3–October 20. Quiel: 2 ♂, 2 ♀, April 25–October 18. Velo: ♂, 2 ♀, June 24, July 1. Gonads enlarged March 24–July 1; slightly enlarged July 25. Altitude 5,200–6,400 feet.

Only two Mönniche specimens were taken above 6,000 feet, an exceptionally high altitude for this species. Three males collected

April 23, May 9, and July 1 had enlarged gonads although still in subadult plumage, as characterized by a black bib and essentially olive pileum.

Mniotilta varia (Linnaeus). Black-and-white Warbler.

Motacilla varia Linnaeus, 1766, Syst. Nat., 12th ed., p. 333—in Jamaica, Dominica, Santo Domingo.

Bajo Mono: ♀, November 25. Lerida: 6 ♂, September 20–December 2. Quiel: ♂, November 13. Velo: ♀, February 24. Altitude 5,200–5,500 feet.

Helmitheros vermivorus (Gmelin). Worm-eating Warbler.

Motacilla vermivora Gmelin, 1789, Syst. Nat., 1, (2), p. 951—Pennsylvania.

Peña Blanca: ♂, October 12, 1938. Altitude 6,000 feet.

Seldom reported in Panama, and but once previously in Chiriquí Province (Barriles, El Volcán, December 15, 1929).

Vermivora chrysoptera (Linnaeus). Golden-winged Warbler.

Motacilla chrysoptera Linnaeus, 1766, Syst. Nat., 12th ed., p. 333—Pennsylvania.

Bajo Mono: 2 ♂, March 23, October 18. Altitude 5,200–5,500 feet.

Vermivora peregrina (Wilson). Tennessee Warbler.

Sylvia peregrina Wilson, 1811, Amer. Orn., 3: 83, pl. 25—Cumberland River, Tennessee.

Bajo Mono: ♀, 2 sex? October 10, 15. Lerida: 10 ♂, 6 ♀, 2 sex? October 5–March 19. Peña Blanca: ♂, October 18. Quiel: ♂, ♀, 3 sex? October 18–February 22. Gonads enlarged November 26. Altitude 5,000–6,000 feet.

Vermivora gutturalis (Cabanis). Flame-throated Warbler.

Compsothlypis gutturalis Cabanis, 1860, Jour. Orn., 8: 329—Irazú, Costa Rica.

Casita Alta: 2 ♂, 2 ♀, June 18–October 9. Fila Lerida: ♂, 3 ♀, June 21, August 13. Lerida: 8 ♂, 3 ♀, December 2–October 18. Quiel: ♂, September 27. Velo: ♂, ♀, July 5–22. Volcán: ♂, August 12. Gonads slightly enlarged July 22. Altitude 5,200–10,300 feet.

Griscom considered 7,000 feet to be the lowest altitude of occurrence on Volcán de Chiriquí and in Costa Rica Carriker found *guttu-*

ralis in abundance only from 7,000–9,000 feet above sea level. Well over half of the Mönniche birds were taken below 6,000 feet. I am not aware of any seasonal migration of this warbler that would account for its occurrence in abundance below the altitudes to which it has heretofore been considered restricted. The advantages of selective collecting in a single area at all seasons over a period of years are obvious.

Parula pitiayumi speciosa (Ridgway). Tropical Parula.

Compsothlypis pitiayumi speciosa Ridgway, 1902, Auk, 19: 69—Boquete, Chiriquí, Panama.

Horqueta: ♂, July 27. Lerida: 2 ♂, 4 ♀, September 26–December 13. Velo: ♂, ♀, June 21. Altitude 5,200–6,400 feet.

Dendroica virens virens (Gmelin). Black-throated Green Warbler.

Motacilla virens Gmelin, 1789, Syst. Nat., 1, (2), p. 985—Pennsylvania.

Alto de Chiquero: ♀, October 16. Casita Alta: ♂, sex? October 30. Fila Lerida: ♀, November 1. Lerida: 11 ♂, 3 ♀, sex? October 9–March 19. Peña Blanca: ♀, November 1. Quiel: 3 ♂, 2 ♀, November 8–March 3. Gonads enlarged March 3, 11; slightly enlarged November 8, 25. Altitude 5,000–9,000 feet.

Birds of the same month vary strikingly in plumage but there appears to be little if any correlation between the stage of moult and evidence of gonadal activity. Only two males of the sixteen listed above had enlarged gonads. Both birds are in typical winter plumage, with the throat-patch obscured. One of the two November males with slightly enlarged gonads is in similar plumage, but the other is conspicuously black-bibbed. Of twelve adult males with inactive gonads, two of five October birds and one of three November birds have conspicuous bibs.

Dendroica fusca (P. L. S. Müller). Blackburnian Warbler.

Motacilla fusca P. L. S. Müller, 1776, Natursyst., Suppl., p. 175—"Guyane"—French Guiana.

Lerida: 11 ♂, 2 ♀, September 19–October 13. Quiel: 2 ♂, September 27, April 25. Altitude 5,300–5,600 feet.

All of these specimens were taken on the Pacific slope where the species obviously is not uncommon as a fall transient. In the past the Caribbean slope was thought to be the primary migratory route of *fusca*.

Seiurus aurocapillus aurocapillus (Linnaeus). Ovenbird.

Motacilla aurocapillus Linnaeus, 1766, Syst. Nat., 12th ed., p. 334—in Pennsylvania—at sea, apparently off Haiti.

Lerida: ♀, November 26. Gonads enlarged. Altitude 5,300 feet.

Seiurus motacilla (Vieillot). Louisiana Waterthrush.

Turdus motacilla Vieillot, 1807 (1808), Hist. Nat. Ois. Amer., 2: 9, pl. 65—Kentucky.

Velo: ♀, October 18. Altitude 5,500 feet.

Seiurus noveboracensis noveboracensis (Gmelin). Northern Waterthrush.

Motacilla noveboracensis Gmelin, 1789, Syst. Nat., 1, (2), p. 958—New York.

Bajo Mono: 2 ♂, October 10, 22. Lerida: ♀, October 15. Altitude 5,300 feet.

Oporornis formosus (Wilson). Kentucky Warbler.

Sylvia formosa Wilson, 1811, Amer. Orn., 3: 85, pl. 25, fig. 3—Kentucky.

Lerida: 3 ♂, September 23–October 23. Peña Blanca: 2 ♂, October 13. Altitude 5,300–6,000 feet.

Oporornis philadelphia (Wilson). Mourning Warbler.

Sylvia philadelphia Wilson, 1810, Amer. Orn., 2: 101, pl. 14, fig. 10—near Philadelphia, Pennsylvania.

Horqueta: ♂, May 16. Lerida: 2 ♂, 2 ♀, sex? October 8–24. Altitude 5,300 feet.

Oporornis tolmiei (Townsend). MacGillivray's Warbler.

Sylvia tolmiei Townsend, 1839, Narr. Jour. Rocky Mts., p. 343—Columbia River=Fort Vancouver, Washington.

Horqueta: ♀, May 16. Lerida: 6 ♀, October 15–22. Gonads slightly enlarged May 16. Altitude 5,300–6,000 feet.

Phillips (1947) has proposed the recognition of four races based on certain minor (and variable!) color differences, absolute tail length, and relative proportions of wing and tail. Two of the races (*austin-smithi*, *intermedia*), and these only, he considers to winter south as far as Chiriquí. Measurements of the Mönniche series, however, are not in accord with Phillips' concept of either form: Eight females: wing 58–63 mm. (60.7); tail 48–51 mm. (49.8); difference between

wing and tail 7–14 mm. (10.8). Inasmuch as these and other migrants in Chicago Natural History Museum agree equally well with birds from the breeding areas of each of the four proposed subspecies I am at present wholly in agreement with the traditional concept of this warbler as a monotypic species.

MacGillivray's warbler has been reported in Guatemala as late as April 26 and several El Salvador specimens in Chicago Natural History Museum were taken May 2–9. The Horqueta record of May 16 stands as the latest for Central America. In Panama the species has been reported only in the vicinity of Volcán de Chiriquí, but two females in our collections were taken by J. F. Ferry at Colón, March 14 and 16, 1908.

***Chamaethlypis poliocephala ridgwayi* Griscom.** Gray-crowned Yellowthroat.

Chamaethlypis poliocephala ridgwayi Griscom, 1930, Proc. New Engl. Zool. Cl., 12: 7—Boruca, Costa Rica.

Lerida: ♀, October 20. Quiel: ♂, gonads slightly enlarged, June 26. Altitude 5,300 feet.

***Wilsonia pusilla pileolata* (Pallas).** Pileolated Warbler.

Motacilla pileolata Pallas, "1811" (=1826?), Zoogr. Rosso-Asiat., 1: 497—Kodiak Island, Alaska.

Alto de Chiquero: sex? November 10. Bajo Mono: ♂, November 17. Casita Alta: ♀, October 9. Horqueta: ♀, May 16. Lerida: 4 ♂, 3 ♀, September 20–December 2. Peña Blanca: ♂, November 1. Quiel: 3 ♂, 2 ♀, September 17–April 25. Gonads slightly enlarged September 17, May 16. Altitude 5,200–9,000 feet.

The Horqueta specimen is the first May record for Panama. Seldom has the species been found elsewhere in Central America later than April. Pileolated warblers winter commonly in Panama, but chiefly at low altitudes. Only two specimens of the Mönniche series were taken above 5,600 feet, these exceptions being from 7,000 and 9,000 feet, respectively.

***Wilsonia canadensis* (Linnaeus).** Canada Warbler.

Muscicapa canadensis Linnaeus, 1766, Syst. Nat., 12th ed., p. 327—Canada.

Bajo Mono: ♀, October 15. Horqueta: 2 ♂, May 9, October 17. Gonads enlarged May 9. Altitude 5,200–5,400 feet.

Setophaga ruticilla (Linnaeus). American Redstart.

Motacilla ruticilla Linnaeus, 1758, Syst. Nat., 10th ed., p. 186—Virginia.

Horqueta: ♂, May 11. Lerida: ♂, November 26. Gonads enlarged May 11. Altitude 5,300–5,500 feet.

Myioborus miniatus aurantiacus (Baird). Slate-throated Redstart.

Setophaga aurantiaca Baird, 1865, Rev. Amer. Bds., 1: 261—Dota Mountains, San José, and Barranca, Costa Rica.

Bajo Mono: ♂, May 13. Lerida: 4 ♂, 2 ♀, March 4–October 30. Quiel: ♂, September 27. Velo: ♂, ♀, July 22, October 2. Gonads enlarged March 4–May 13; slightly enlarged July 22. Altitude 5,300–6,300 feet.

I am unable to detect any significant difference between birds from Chiriquí and those from Costa Rica. In series, both populations show considerable variation in the yellow of the under parts but each of the Panama specimens listed above agrees in minute detail with one or several of the more northern birds. Only one Costa Rican specimen (Turrialba, September 25) of twenty-five now before me is appreciably darker (more orange) below than any of the Chiriquí birds at hand. There is not even a tendency toward paleness in the southern birds that would justify recognition of a separate race (*acceptus*).

Myioborus torquatus (Baird). Collared Redstart.

Setophaga torquata Baird, 1865, Rev. Amer. Bds., 1: 261—San José, Costa Rica.

Bajo Mono: ♀, March 23. Camp Cilindro: ♀, July 16, 1933. Casita Alta: 2 ♂, 2 ♀, June 18; October 9, 30. Fila Lerida: ♂, sex? August 13. Gonads slightly enlarged March 23. Altitude 5,300–9,000 feet.

Two immature birds collected June 18 and August 13 are essentially dusky brownish (not slate-colored) above, and darkest on the crown, which is wholly lacking in chestnut and shows but an indication of a black border. The Camp Cilindro specimen is the first of record from Bocas del Toro.

Basileuterus tristriatus melanotis Lawrence. Three-striped Warbler.

Basileuterus melanotis Lawrence, 1868, Ann. Lyc. Nat. Hist. N. Y., 9: 95—Cervantes and Birrés, Costa Rica.

Alto de Chiquero: ♂, May 1. Bajo Mono: 2 ♂, 2 ♀, June 18–October 15. Camp Cylindro: 3 ♀, July 14–16, 1933. Gonads enlarged May 1. Altitude 5,200–6,000 feet.

Apparently rare, both in Costa Rica and in Panama. The Camp Cylindro specimens are the first of record from Bocas del Toro. I have seen no Veraguas birds (*chitrensis*), but question their distinctness in view of the variability apparent in a representative series of *melanotis* from Chiriquí.

Basileuterus culicivorus godmani Berlepsch. Golden-crowned Warbler.

Basileuterus godmani Berlepsch, 1888, Auk, 5: 450—"Veragua"—Chiriquí, Panama.

Camiseta: ♀, July 3. Lerida: 4 ♂, 3 ♀, August 4–November 26. Quiel: 3 ♂, 2 sex? February 24–December 18. Velo: ♂, 3 ♀, June 15–July 2. Gonads slightly enlarged June 15–October 18. Altitude 5,100–6,000 feet.

Basileuterus melanogenys eximius Nelson. Black-cheeked Warbler.

Basileuterus melanogenys eximius Nelson, 1912, Smiths. Misc. Coll., 60, no. 3, p. 22—Boquete, Panama.

Alto de Chiquero: ♂, March 13. Casita Alta: ♂, ♀, October 9. Cordillera: ♂, ♀, November 18. Fila Lerida: ♂, ♀, sex? July 29. Lerida: 2 ♂, 2 ♀, June 21, November 21. Quiel: ♂, October 13. Velo: ♀, October 20. Gonads enlarged March 13; slightly enlarged June 21. Altitude 5,200–9,200 feet.

These specimens average paler below and are slightly but consistently duller (less olivaceous) above than Costa Rican birds. A weak but recognizable race.

The appearance of three immature birds collected June 21 and July 29 suggests the breeding period to be late March and early April.

Basileuterus delatarii mesochrysus Sclater. Chestnut-capped Warbler.

Basileuterus mesochrysus Sclater, 1860, Proc. Zool. Soc. London, 28: 251—"Bogotá."

Horqueta: 2 ♂, ♀, May 7–July 29. Gonads enlarged May 7; slightly enlarged July 29. Altitude 5,200 feet.

Basileuterus fulvicauda veraguensis Sharpe. Buff-rumped Warbler.

Basileuterus veraguensis Sharpe, 1885, Cat. Bds. Brit. Mus., 10: 403—Paraiso Station, Panama Railroad, Panama.

Horqueta: ♂, gonads enlarged April 5; ♀, gonads slightly enlarged May 21. Altitude 5,400 feet.

The immature plumage of this species seems to be undescribed. The pattern of development is suggested by a young Costa Rica male (*leucopygia*) in Chicago Natural History Museum which differs from adults in having the throat and chest virtually concolorous with the upper parts, and the median belly strongly tinged with buff. In the latter respect this juvenile more nearly resembles adult *veraguensis* than adult *leucopygia*.

Amblycercus holosericeus holosericeus (Lichtenstein). Yellow-billed Cacique.

Sternus holosericeus Lichtenstein, 1830, Preis-Verz. Säug. Vögel Mex., p. 1—Mexico=Alvarado, Vera Cruz.

Casita Alta: ♂, ♀, October 20. Horqueta: ♂, May 7. Volcán: ♂, July 27. Gonads enlarged May 7. Altitude 5,300–9,700 feet.

In Panama this species occupies a variety of habitats from sea level to the highest altitudes that offer cover. A specimen collected near the summit of Volcán de Chiriquí (10,300 feet) by W. W. Brown in 1901 apparently is the highest altitude of record. Northward, in Mexico and northern Central America, *holosericeus* is essentially a bird of the lowlands and rarely if ever is found above 5,500 feet.

A marked difference in the habits of geographically remote populations of any widespread form suggests the possibility, at least, of measurable morphological differences. None has been fully demonstrated in Middle American examples of *holosericeus*, although a distinct Costa Rican race (*centralis* Todd), characterized as differing from northern birds in the relative proportions of the wing and tail, has been proposed.

Investigating the validity of *centralis*, Peters (1929, p. 475) measured a series of 87 Middle American specimens and found that although 19 (100 per cent) of the birds from Honduras northward had shorter wings than tails, a majority of specimens from Costa Rica and Panama had similar proportions. The variability of *holosericeus* is further demonstrated by the measurements of 43 Middle American specimens now before me. Of these, 21 birds have shorter wings than

tails, 15 have longer wings than tails, and 7 have wings and tails of equal length. No geographic correlation is evident. Indeed, contrary to Peters' results, I find that birds from Mexico and northern Central America have proportions fully as variable as those from Nicaragua southward.

Icterus galbula (Linnaeus). Baltimore Oriole.

Coracias galbula Linnaeus, 1758, Syst. Nat., 10th ed., p. 108—America=Virginia.

Alto de Chiriquí: ♂, October 16. Lerida: 3 ♂, 3 ♀, October 5–November 23. Altitude 5,300–5,400 feet.

Recorded at Boquete as late as April 15; known in Panama from October 2 to April 20.

Sturnella magna subulata Griscom. Common Meadow Lark.

Sturnella magna subulata Griscom, 1934, Bull. Mus. Comp. Zool., 75: 405—Boquete, Panama.

Horqueta: ♂, gonads enlarged, May 10. Altitude 5,300 feet.

Measurements: wing 100 mm.; tail 63 mm.; exposed culmen 35 mm. Except in length of bill, this form is conspicuously smaller than *alticola*, as shown by the measurements of twelve Costa Rican males: Wing 103–121 mm. (111.6); tail 67–80 mm. (72.5); exposed culmen 30–34 mm. (31.8). Possibly *subulata* averages brighter, more intensely yellow below than *alticola*, but individuals can not be distinguished with certainty by this character alone.

Chlorophonia occipitalis callophrys (Cabanis). Blue-crowned Chlorophonia.

Triglyphidia callophrys Cabanis, 1860, Jour. Orn., 8: 331—Costa Rica.

Alto de Chiquero: ♀, March 24. Casita Alta: ♂, March 9. Horqueta: ♂, June 18. Lerida: 3 ♂, 3 ♀, March 5–December 13. Quiel: ♂, 2 ♀, March 3–June 30. Gonads enlarged March 5–24; slightly enlarged June 18. Altitude 5,300–6,800 feet.

A male in subadult plumage, collected March 5, had enlarged gonads. I find no evidence that *callophrys* retains this plumage until its third year, as suggested by Carriker (1910, p. 874).

Tanagra musica elegantissima (Bonaparte). Blue-hooded Euphonia.

Pipra elegantissima Bonaparte, 1837, Proc. Zool. Soc. London, 5: 112—Mexico.

Alto de Chiquero: ♀, March 24. Horqueta: 2 ♂, ♀, May 11. Lerida: 4 ♂, 2 ♀, March 5–September 18. Quiel: 2 ♂, April 25, June 26. Velo: ♂, ♀, March 8, May 13. Gonads enlarged March 5–June 13; slightly enlarged September 18. Altitude 5,200–6,400 feet.

During the breeding season this tanager apparently is restricted to the Subtropical Zone; at other times it may be found at altitudes ranging from 1,200 feet to 10,000 feet above sea level. Each of the several nests of record were found in May, but the plumages of two immature birds in Chicago Natural History Museum indicate a nesting span of at least five months (March–July).

Tanagra luteicapilla (Cabanis). Yellow-crowned Euphonia.

Phonasca luteicapilla Cabanis, 1860, Jour. Orn., 8: 332—Costa Rica.

Horqueta: ♂, gonads enlarged, May 21. Altitude 5,400 feet.

Four Costa Rican males (December 4–April 16) clearly illustrate the sequence of plumage changes from the olive-colored juvenile stage to a much later but still subadult condition. All four birds are essentially blue-throated, but only two (March 19 and April 16) have conspicuously yellow crowns and blue-flecked upper parts strongly suggestive of the adult. The Horqueta male represents an even more advanced stage. From present evidence it is obvious that *luteicapilla* breeds while in immature plumage and acquires the fully adult livery by a complete postnuptial moult, possibly as late as the third year.

Tangara icterocephala (Bonaparte). Silver-throated Tanager.

Calliste icterocephala Bonaparte, 1851, Compt. Rend. Acad. Sci. Paris, 31: 76—Ecuador= Valley of Punta Playa, near Quito.

Alto de Chiquero: ♂, ♀, March 24. Bajo Mono: ♀, October 15. Horqueta: ♂, May 11. Lerida: 5 ♂, ♀, April 10–December 16. Quiel: ♂, 2 ♀, March 3–December 18. Velo: ♂, 4 ♀, March 7–June 24. Gonads enlarged March 7–July 2. Altitude 5,200–6,400 feet.

Tangara gyrola bangsi (Hellmayr). Bay-headed Tanager.

Calospiza gyrolaoides bangsi Hellmayr, 1911, Proc. Zool. Soc. London, 1911: 1105—Boquete, Chiriquí, Panama.

Horqueta: 2 ♂, 4 ♀, May 10–July 29. Lerida: ♂, ♀, November 20, 22. Gonads enlarged May 10–June 18; slightly enlarged November 22. Altitude 5,200–5,400 feet.

Skutch (1954, pp. 238, 239) has called attention to the fact that this tanager has a remarkably extended breeding season (February–

October) and broods twice, if not three times a year. One of the Horqueta males collected May 18 was sexually mature, although still in juvenile plumage. The fully adult plumage apparently is assumed by a postnuptial moult, as with *Tanagra luteicapilla*.

Tangara dowii (Salvin). Spangle-cheeked Tanager.

Calliste dowii Salvin, 1863, Proc. Zool. Soc. London, 1863: 168—"San José," Costa Rica.

Alto de Chiquero: ♂, March 24. Bajo Mono: ♀, 2 sex? March 23, October 15. Camp Holcomb: ♂, June 26. Cordilleras: 2 ♂, 2 ♀, May 13-16. Gonads active March 23-May 16. Altitude 5,000-6,500 feet.

Not previously reported on the Caribbean slope in Panama. This tanager normally occurs at higher elevations than any of its Central American relatives and has been found up to timber-line in Costa Rica. In Panama it occurs from 4,000-7,500 feet above sea level but is seldom met below 5,000 feet.

Thraupis virens cana (Swainson). Blue-gray Tanager.

Tanagra cana Swainson, 1836, Orn. Draw., pt. 3, pl. 37—Caracas, Venezuela (ex Hellmayr, 1924).

Horqueta: ♂, May 9. Lerida: 3 ♀, April 30-November 5. Quiel: ♀, April 25. Velo: ♀, May 2. Gonads enlarged April 30, May 9. Altitude 5,200-5,400 feet.

Hellmayr, with 124 examples of *diaconus* and *cana* at his disposal, chose with conspicuous reluctance to recognize the Middle American form. On examining most of Hellmayr's specimens and much additional material, including Mexican birds which were not available to him, I have been unable to find any evidence of geographical differentiation. The characters attributed to *diaconus* are extensively duplicated among the Colombian and Venezuelan birds (71) now before me and apparently are related to age, season, and possibly sex.

Ramphocelus dimidiatus pallidirostris Hellmayr. Crimson-backed Tanager.

Ramphocelus dimidiatus pallidirostris Hellmayr, 1936, Field Mus. Nat. Hist., Zool. Ser., 13, pt. 9, p. 256—Divalá, Chiriquí, Panama.

Horqueta: ♂, ♀, May 9, July 27. Gonads enlarged May 9. Altitude 5,200 and 5,400 feet.

In color of bill, the Horqueta male agrees in minute detail with two Canal Zone males. The bill of the female is almost uniform in

color, and darker than the bill of a Canal Zone bird, which, in turn, is conspicuously darker than a Chiriquí specimen collected in 1903. Measurements: ♂, wing 78, tail 72; ♀, wing 75, tail 72.

Piranga rubra rubra (Linnaeus). Summer Tanager.

Fringilla rubra Linnaeus, 1758, Syst. Nat., 10th ed., p. 181—South Carolina.

Alto de Chiquero: ♂, March 24. Bajo Mono: ♂, October 10. Callejon de Palmas: ♂, October 20. Casita Alta: ♂, October 9. Lerida: ♂, ♀, October 24, 25. Peña Blanca: ♀, October 11. Quiel: ♀, October 18. Velo: ♀, December 6. Gonads slightly enlarged October 24 and December 6. Altitude 5,200–7,500 feet.

Piranga leucoptera latifasciata Ridgway. White-winged Tanager.

Piranga leucoptera latifasciata Ridgway, 1887, Man. N. Amer. Bds., p. 457—Costa Rica and Veragua.

Lerida: 3 ♂, 7 ♀, June 14–December 12. Quiel: 3 ♂, November 5, 13. Velo: ♂, ♀, June 15, 18. Gonads enlarged June 14–16. Altitude 5,000–5,400 feet.

In my opinion this race is questionable, since a considerable percentage of its individuals prove to be indeterminate. Nevertheless, Panama birds (males) in series can be separated from representative *leucoptera* by virtue of the broader (average) middle wing-bar and sometimes more extended greater wing-bar.

Piranga bidentata citrea van Rossem. Flame-colored Tanager.

Piranga bidentata citrea van Rossem, 1934, Trans. San Diego Soc. Nat. Hist., 7: 367—Boquete, Chiriquí, Panama.

Bajo Mono: ♂, October 15. Lerida: 5 ♂, 12 ♀, February 23–November 23. Quiel: 2 ♂, 3 ♀, November 8–15. Gonads enlarged February 23–June 18; slightly enlarged November 8, 23. Altitude 5,000–6,300 feet.

Twenty-one males from Panama and Costa Rica are decidedly varied, especially in the color of the under parts, and as a group are indistinguishable from *sanguinolenta*. Females are much less variable and, with few exceptions, are easily separated from the three available northern birds by virtue of their paler, more purely yellow under parts and more decidedly yellowish (less olive) green upper parts. The latter character is most pronounced on the head.

Eucometis penicillata stictothorax Berlepsch. Gray-headed Tanager.

Eucometis penicillata stictothorax Berlepsch, 1888, Auk, 5: 451, 452—"Veragua"—Chiriquí, Panama.

Horqueta: ♀, May 9. Lerida: ♂, ♀, July 23, August 4. Gonads slightly enlarged May 9. Altitude 5,300–5,400 feet.

The diagnostic character of this form, often obscure in adults, is strongly accentuated in olive-headed immature birds. All juveniles of related races examined lack entirely the vermiculation or streaking of the breast and flanks that is so conspicuous in *stictothorax* of comparable age.

The distribution of *stictothorax* and *spodocephala* respectively in Costa Rica is not at all clear. Most writers, including Hellmayr, accept Carriker's (1910) designation of the Río Grande de Pirris as their common boundary. Although this concept is supported by the similarity of eleven birds from Chinandega, Rivas and Cartago to a Nicaraguan series, four specimens from Guanacaste (Las Canas and Miravalles) agree in minute detail with south Costa Rica and Chiriquí birds.

Chlorospingus ophthalmicus novicius Bangs. Common Bush-Tanager.

Chlorospingus novicius Bangs, 1902, Proc. New Engl. Zool. Cl., 3: 67—Volcán de Chiriquí, Panama.

Alto de Chiquero: 2 ♂, 2 ♀, April 2–October 16. Bajo Mono: 2 ♂, ♀, March 23–October 11. Camp Cilindro: ♂, July 14. Cedral: ♀, July 14. Cordilleras: ♂, May 14. Lerida: ♂, ♀, October 22, November 23. Peña Blanca: ♂, ♀, October 15. Quiel: ♂, March 3. Velo: ♂, June 21. Gonads enlarged March 3–July 14; slightly enlarged October 16. Altitude 5,200–6,000 feet.

The two birds collected at Camp Cilindro and Cedral on the north slope of the cordillera are the first of record from Bocas del Toro. In Costa Rica *novicius* apparently is restricted to the Pacific slope in the extreme south. Elsewhere, the typical Costa Rican form, *regionalis*, inhabits both slopes but is most numerous on the Caribbean side where humid conditions permit it to descend as low as 1,200 feet above sea level.

Chlorospingus pileatus pileatus Salvin. Sooty-capped Bush-Tanager.

Chlorospingus pileatus Salvin, 1864, Proc. Zool. Soc. London, 1864: 581—Volcán de Cartago=Irazú, Costa Rica.

Alto de Chiquero: 2 ♂, ♀, March 24–April 23. Casita Alta: 2 ♂, 3 ♀, June 12–October 30. Cordilleras: ♀, May 12. Peña Blanca: ♂, ♀, October 2. Río Caldera: ♂, May 2. Gonads enlarged March 24–May 12; slightly enlarged June 21–August 12. Altitude 6,000–8,500 feet.

Essentially a bird of the Temperate Zone, but occasionally found as low as 5,000 feet on Volcán de Chiriquí. Six of the ten specimens listed above were collected below 7,000 feet, well within the zone occupied by *C. ophthalmicus*.

Saltator maximus intermedius Lawrence. Buff-throated Saltator.

Saltator intermedius Lawrence, 1864, Proc. Acad. Nat. Sci. Philadelphia, p. 106
—New Granada, Isthmus of Panama.

Alto de Chiquero: ♂, May 9. Horqueta: ♂, ♀, July 26, 28. Lerida: ♂, 2 ♀, August 12, December 13. Quiel: ♂, December 18. Gonads enlarged May 9–August 12. Altitude 5,200–6,000 feet.

Saltator albicollis furax Bangs and Penard. Streaked Saltator.

Saltator striatipictus furax Bangs and Penard, 1919, Bull. Mus. Comp. Zool., 63: 32—near Boruca, Costa Rica.

Horqueta: ♂, May 7. Lerida: 3 ♂, 1 ♀, May 10–October 15. Quiel: ♀, September 2. Gonads enlarged May 7–June 13; slightly enlarged October 15. Altitude 5,000–5,400 feet.

A poorly defined race, possibly averaging darker (greener) below than *isthmicus* and with more conspicuous streaking, but many individuals not certainly separable.

Pheucticus tibialis Lawrence. Black-thighed Grosbeak.

Pheucticus tibialis (Baird MS.) Lawrence, 1867, Ann. Lyc. Nat. Hist. N. Y., 8: 478—Cervántes, Costa Rica.

Horqueta: ♂, July 26. Lerida: 2 ♂, ♀, October 15–December 13. Gonads enlarged July 26. Altitude 5,200–6,800 feet.

Three of the four specimens listed above have small white apical spots on their outer rectrices and the wing coverts of two are partly white-tipped. Hellmayr, noting two similar variants in a series of fifteen specimens from Costa Rica and Panama, concluded that *tibialis* is but a strongly marked race of *chrysopeplus*. The evidence favoring this concept suggests a common ancestry and continuing

affinity of some degree, but in my opinion *tibialis* seems obviously to have evolved beyond the limits properly encompassed by *chrysopeplus*.

Pheucticus ludovicianus (Linnaeus). Rose-breasted Grosbeak.

Loxia ludoviciana Linnaeus, 1766, Syst. Nat., 12th ed., p. 306—Louisiana.

Lerida: ♂, 3 ♀, October 22–December 4. Quiel: ♂, November 8. Gonads enlarged December 4; slightly enlarged November 26. Altitude 5,000–5,300 feet.

Reported in the vicinity of Volcán de Chiriquí from late October through February. Carriker mentions a specimen taken in Costa Rica as early as August 13, and Chicago Natural History Museum has a skin from Limón collected April 12. Spring stragglers may be expected in Central America even later, as evidenced by a Venezuelan specimen dated April 14. The significance of these dates is enhanced by reference to the dates of arrival and departure in northern latitudes: Chicago area: April 23 (early), May 7 (average), September 23 (early), October 9 (average); breeding, May 18.

Passerina cyanea (Linnaeus). Indigo Bunting.

Tanagra cyanea Linnaeus, 1766, Syst. Nat., 12th ed., p. 315—Carolina=South Carolina.

Horqueta: ♂, March 20. Lerida: ♂, May 10. Gonads slightly enlarged. Altitude 5,300 feet.

This bunting winters south only to western Panama and ordinarily departs from Central America before the last of April. Of interest is a male in changing, brown-blotched plumage, collected at Limón, Costa Rica, June 11 (collection of Chicago Natural History Museum).

Tiaris olivacea pusilla Swainson. Yellow-faced Grassquit.

Tiaris pusillus Swainson, 1827, Phil. Mag., (n.s.), 1, no. 6, p. 438—Temascaltepec and Real del Monte, Mexico.

Alto de Chiquero: ♂, October 16. Bajo Mono: ♂, ♀, March 23, May 19. Lerida: ♂, 2 ♀, June 13, 24; October 19. Quiel: ♂, February 22. Velo: 2 ♂, February 24, June 21. Gonads enlarged February 2–October 16. Altitude 5,200–5,500 feet.

Amaurospiza concolor concolor Cabanis. Blue Seedeater.

Amaurospiza concolor Cabanis, 1861, Jour. Orn., 9: 3—Costa Rica.

Camiseta: ♂, July 3. Lerida: ♂, 2 ♀, June 21–November 25. Peña Blanca: ♀, May 8. Quiel: 2 ♂, October 13, November 7.

Velo: ♂, May 2. Gonads enlarged May 2–June 21. Altitude 5,000–6,400 feet.

This fine series more than doubles the number of specimens known from Chiriquí, where the species apparently is much more abundant than hitherto realized. In the absence of comparative material I follow Hellmayr in treating *australis* as a synonym.

Volatinia jacarina splendens (Vieillot). Blue-black Grassquit.

Fringilla splendens Vieillot, 1817, Nouv. Dict. Hist. Nat., nouv. éd., 12: 173—Cayenne.

Horqueta: 2 ♂, ♀, April 5–July 27. Gonads enlarged April 5. Altitude 5,300 feet.

Abundant in suitable habitat throughout the lowlands, but seldom reported above an altitude of 3,500 feet. I find no previous reference to its presence in the immediate vicinity of Volcán de Chiriquí. Further infiltration of the highlands is likely as modification of the original vegetation continues.

Spinus xanthogaster xanthogaster (Du Bus). Yellow-bellied Siskin.

Chrysomitris xanthogaster Du Bus, 1855, Bull. Acad. Sci., Lettr. et Beaux-Arts Belg., 22, (1), p. 152—Ocaña, Colombia.

Bajo Mono: 2 ♂, ♀, May 13, 14. Lerida: ♂, 2 ♀, September 20, November 25, 26. Peña Blanca: ♂, ♀, October 18. Quiel: ♂, February 22. Gonads enlarged February 22–May 14. Altitude 5,200–6,000 feet.

Hellmayr, in his *Birds of the Americas*, included this species in the fauna of Panama on the basis of a single specimen in Chicago Natural History Museum, collected at Boquete, October 12, 1905. Eisenmann (*in litt.*) reports having observed yellow-bellied siskins in the vicinity of Boquete, and the series taken by Mönniche over a period of years (1932–39) indicates *xanthogaster* to be not uncommon locally, although not listed for Panama by either Ridgway or Griscom.

Spinus psaltria colombianus (Lafresnaye). Dark-backed Goldfinch.

Carduelis colombianus Lafresnaye, 1843, Rev. Zool., 6: 292—"Colombie"—Bogotá.

Bajo Mono: ♀, October 15. Lerida: 8 ♂, 5 ♀, sex? May 2–November 26. Gonads enlarged October 8–15; slightly enlarged June 14. Altitude 5,300 feet.

Hitherto reported in Panama only at Calobre, Veraguas, and at Paraiso and Lion Hill Stations in the Canal Zone. Griscom credits the species only for the Pacific slope of the western half of the Canal Zone. It is difficult to understand why this bird has been overlooked in Chiriquí, where apparently it is not uncommon.

Evidence of gonadal activity in October is in agreement with the known late-breeding habits of other races. A Lerida female collected May 2 is in moulting, pre-nuptial plumage and the gonads were not enlarged.

Pezopetes capitalis Cabanis. Large-footed Finch.

Pezopetes capitalis Cabanis, 1860, Jour. Orn., 8: 415—Costa Rica.

Bajo Mono: ♂, July 23. Callejon de Palmas: ♀, August 8. Camp Holcomb: ♀, June 26. Casita Alta: 4 ♂, 2 ♀, sex? March 9–October 23. Copete: ♂, July 8. Gonads enlarged March 9–October 2. Altitude 5,000–9,800 feet.

The Camp Holcomb bird is the first recorded from Bocas del Toro. Its presence at an altitude of only 5,000 feet is remarkable, for the species is virtually restricted to the Temperate Zone and is seldom found as low as 7,000 feet.

A male in breeding condition from Casita Alta is partly albinistic, with numerous white feathers on the head and throat.

Pselliophorus tibialis (Lawrence). Yellow-thighed Finch.

Tachyphonus tibialis Lawrence, 1864, Ann. Lyc. Nat. Hist. N. Y., 8: 71—San José, Costa Rica.

Alto de Chiquero: ♂, March 13. Camiseta: ♀, immature? July 3. Casita Alta: 2 ♀, March 9–October 20. Cordilleras: 4 ♂, May 16–November 19. Lerida: 2 ♂, October 8, 13. Peña Blanca: ♀, 4 sex? July 24–November 5. Quiel: ♀, November 24. Volcán: ♂, July 28. Gonads enlarged March 13–May 16; slightly enlarged July 28. Altitude 5,300–10,200 feet.

Five of sixteen obviously mature birds have a more or less conspicuous yellow edging to the wing. This character appears in nine of twenty-one Costa Rican specimens and seems to have no significance relating to age, sex or locality. The Chiriquí series possibly averages more olivaceous below than Costa Rican birds, but the high percentage of individual exceptions precludes separation of these populations.

Atlapetes gutturalis brunnescens Chapman. Yellow-throated Brush-Finch.

Atlapetes gutturalis brunnescens Chapman, 1915, Bull. Amer. Mus. Nat. Hist., 34: 387—Boquete, Chiriquí, Panama.

Cordilleras: ♀, May 13. Lerida: 4 ♂, ♀, March 19–June 27. Quiel: ♂, December 18. Gonads active April 11–June 27. Altitude 5,300–6,500 feet.

The characters given for *brunnescens* are not evident in this series as compared with three very old examples of *gutturalis* at my disposal. The Chiriquí birds are consistently dusker (less brownish) above than the Colombian specimens and I find no distinction in the color of the flanks and under tail coverts. Sex for sex, birds from western Panama possibly have smaller bills on an average than the nominate race and for the present it seems best to recognize both.

Eight Costa Rican specimens have slightly paler throats than birds from western Chiriquí, but they agree minutely in every other respect. I am unable now to check the merits of *coloratus* and *azueensis* but a thorough revision of the species obviously is needed.

Atlapetes brunnei-nucha elsae Parkes. Chestnut-capped Brush-Finch.

Atlapetes brunnei-nucha elsae Parkes, 1954, Condor, 56: 135—Volcán de Irazú, Costa Rica.

Alto de Chiquero: ♂, May 13. Bajo Mono: 2 ♀, May 13, July 23. Cordilleras: ♂, November 19. Lerida: ♂, ♀, March 19, June 18. Quiel: ♂, November 5. Velo: ♂, 2 ♀, February 24–November 1. Gonads enlarged February 24–May 13; slightly enlarged July 23. Altitude 5,200–6,600 feet.

Lysurus crassirostris (Cassin). Sooty-faced Finch.

Buarremon crassirostris Cassin, 1865, Proc. Acad. Nat. Sci. Philadelphia, p. 170—Barranca, Costa Rica.

Bajo Mono: ♂, April 26. Cedral: ♀, July 14, 1933. Gonads enlarged April 26. Altitude 4,800–5,600 feet.

The Cedral specimen is our first evidence that *crassirostris* occurs on both slopes of the cordilleras, in Panama as well as in Costa Rica. Although this finch is difficult to find because of its preference for ravines and impenetrable undergrowth, W. W. Brown's success in collecting fourteen specimens at Boquete and Volcán de Chiriquí some years ago indicates that it is not so rare as generally believed.

Arremonops conirostris richmondi Ridgway. Green-backed Sparrow.

Arremonops richmondi Ridgway, 1898, Auk, 15: 228—Greytown, Nicaragua.

Bajo Mono: ♂, May 19. Horqueta: ♀, September 2. Lerida: 4 ♂, ♀, May 10–October 11. Quiel: ♂ (immature), September 17. Gonads enlarged May 19–July 2. Altitude 5,300–5,500 feet.

This race is very poorly defined, and barely if at all separable from *striaticiceps* of eastern Panama. Comparing birds of similar age and degree of wear, I find that a series of more than thirty Costa Rica and Chiriquí specimens agrees minutely with eight skins from Colón, both as to the gray of the head and the color of the back. The chest of *richmondi* possibly averages somewhat darker than *striaticiceps* and this character of doubtful stability is at present the only basis for separating the two.

Ridgway, noting that most specimens from the line of the Panama Railroad are "hardly distinguishable from the Central American form," nevertheless referred them to "*conirostris*" on the basis of their slightly superior size. While a size differential between the Central American and Colombian forms is suggested by Ridgway's average measurements, the pronounced overlap in his extremes virtually precludes recognition of two races on the basis of size alone. Direct comparison of new material with Ridgway's measurements is now impossible since he lumped under *conirostris* the measurements of birds both from Panama (as far west as the Panama Railroad) and from Colombia. Measurements of Central American specimens alone fail to show any significant difference between *richmondi* and *striaticiceps* as regards size. Costa Rica and Chiriquí (13 males): wing 75–82 mm. (79.2); tail 67.2–71.3 mm. (69.2). Colón, Panama (5 males): wing 78–82 mm. (79.4); tail 67–74 mm. (68.2).

The juvenile plumage of *richmondi*, of which I find no description, is strikingly different from that of adults. An immature male collected at Quiel on September 17 is essentially dull olive above and yellowish below, especially on the throat and belly. The crown is almost uniformly dusky brown, this forming streaks on the nape and reappearing on the back as broad stripes. Sides of head yellowish olive, relieved by a dusky eye-streak. Breast olive, broadly streaked with dusky brown.

Junco vulcani (Boucard). Volcano Junco.

Zonotrichia vulcani Boucard, 1878, Proc. Zool. Soc. London, 1878: 57—Volcán de Irazú, Costa Rica.

Volcán: 3 ♂, 3 ♀, January 1–July 30. Gonads slightly enlarged July 28. Altitude 10,100 feet.

Zonotrichia capensis costaricensis Allen. Rufous-collared Sparrow.

Zonotrichia capensis costaricensis Allen, 1891, Bull. Amer. Mus. Nat. Hist., 3: 374—San José, Costa Rica.

Bajo Mono: Immature? October 10. Lerida: 8 ♂, 3 ♀, 5 sex? February 23–October 24. Peña Blanca: ♂, October 15. Volcán: 2 ♂, July 29, October 29. Gonads enlarged February 23–October 29. Altitude 5,200–10,100 feet.

A nest with incubating eggs found at Lerida, February 23, is the earliest of record in Central America. Available nesting records indicate that at least two broods are raised each year, the breeding peaks apparently being in May and August. Six juveniles collected by Mönniche are dated from March 19 to October 10.